

ISBN 978-83-87846-73-2

CONSERVATION AND RESTORATION OF XEROTHERMIC GRASSLANDS IN POLAND

THEORY AND PRACTICE



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(Maps used in the text were derived from <http://natura2000.gdos.gov.pl/natura2000/>)

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ISBN 978-83-87846-73-2

This publication was published under the auspices of *Conservation and restoration of xerothermic grasslands in Poland – theory and practice* project, funded by the LIFE+ Financial Instrument of the European Commission and the National Fund for Environmental Protection and Water Management.



Printing: SONAR Gorzów Wielkopolski, ul. Kostrzyńska 89, www.sonar.pl



CONSERVATION AND RESTORATION OF XEROTHERMIC GRASSLANDS IN POLAND – THEORY AND PRACTICE

The Naturalists' Club in partnership with the Regional Directorate for Environmental Protection in Lublin is implementing a project entitled "Conservation and restoration of xerothermic grasslands in Poland – theory and practice" from 2010 to 2013 in northwestern and southeastern Poland. This project is financed by the European Commission's LIFE+ Financial Instrument and the National Fund for Environmental Protection and Water Management.

The lower valleys of the Oder and Warta Rivers, as well as the extended region of Lublin have one of the richest and largest concentrations of xerothermic grasslands in the country. Eight Natura 2000 sites chosen for the project (Dolna Odra, Ujście Warty, Niedzieliska, Kały, Żurawce, Dobużek and Zachodniowołyńska Dolina Bugu) are in large part areas brought under protection chiefly to preserve xerothermic vegetation. Xerothermic grasslands comprise as much as 50-70% of some of these sites (among them: Kały, Stawska Góra, Żurawce, Niedzieliska), including plots with orchids. Furthermore, other habitats listed in the Habitats Directive also occur in parts of the areas included in the project: xeric sand calcareous grasslands, *Juniperus communis* formations on heaths or calcareous grasslands, subcontinental peri-pannonic scrub with dwarf cherry *Prunus fruticosa* and riparian mixed forests of oak, elm and ash species along great rivers.



Locations of the Natura 2000 sites included in the project (I - Dolna Odra, II - Ujście Warty, III - Stawska Góra, IV - Niedzieliska, V - Kąty, VI - Żurawce, VII - Dobużek, VIII - Zachodniowolyńska Dolina Bugu)

Some of Poland's rarest xerothermic species occur at the sites included in the project. Among them are the following species from Annex II of the Habitats Directive: *Spermophilus suslicus*, *Sicista subtilis*, *Colias myrmidone*, *Maculinea teleius*, *Lycaena dispar*, *Cypridium calceolus*, *Echium russicum* and *Carlina onopordiifolia*. Additionally, valuable plant species listed in the Polish Red Data Book of Plants are found at each of the sites, among them: *Stipa pulcherrima*, *Stipa joannis*, *Stipa borys-thenica*, *Anthericum liliago*, *Carex supina*, *Muscari comosum*, *Orchis purpurea*, *Prunus fruticosa*, *Senecio macrophyllus*, *Hypericum elegans*, *Veratrum nigrum*, as well as many other rare and protected species.

The sites included in the project, as is the case with most xerothermic grassland areas in Poland and Europe, have come under severe threat over the last few decades from intensified agricultural practices and related changes in land use. These grasslands are especially affected by the abandonment of extensive grazing and resulting natural succession, as well as by afforestation, plowing and transformation into culti-

vated fields. Other negative processes include grassland eutrophication and the invasion of non-native species related to changes in abiotic conditions.

This project aims to prevent further negative changes occurring as a result of the processes enumerated above. Its main goal is the comprehensive protection of the most valuable areas of xerothermic grasslands in northwestern and southeastern Poland, together with its specific flora and fauna. All activities are directed toward protecting the mosaic of thermophilous habitats, important in maintaining high biodiversity and numerous plant and animal species with varying habitat requirements (among them, fringe and shrub species).

To learn more about the project and follow its progress – see the website at:

<http://www.murawy-life.kp.org.pl>



The colorful grasslands of the lower Oder River Valley

WHAT ARE XEROTHERMIC GRASSLANDS?

Xerothermic grasslands with their unique flora and fauna are among the most valuable and, at the same time, most severely threatened habitats of Europe's natural environment. They have been listed in Annex I of the Habitats Directive as a habitat of special significance for the Community, requiring protection in all member states.

Xerothermic grasslands have been recognized as a habitat with one of the most species-rich plant assemblages, comprised of many protected and rare, often relict, species of plants and animals.

In Poland, xerothermic assemblages are isolated, separated from their main ranges of occurrence as extra-zonal plants inhabiting the warmest, sunniest, driest and most calcium-rich sites – mainly on open slopes of varying incline facing the S, SW, W and SE directions. Their origin in Poland and neighboring countries is dated from the last ice age that occurred in Europe about 10,000 years ago. The lack of forested terrain after the glaciers receded and the significant warming of the climate that followed enabled xerothermic species to expand from their strongholds in southern and eastern Europe and Asia. Successive climate changes led to the complete prevalence of shaded deciduous forests in central Europe. Xerothermic grasslands were pushed out to the most extreme habitats – to steep and unstable escarpments, the slopes of river valleys, rocky outcrops, etc. The renewed expansion of thermophilous species was aided by humans. By clearing forests, mowing, burning and putting animals out to graze, open areas were formed, enabling xerothermic species to expand again. Currently, it is estimated that most xerothermic grasslands in Poland are semi-natural, in that they originated and are maintained by

The mosaic of grasslands and thermophilous shrubs

many centuries of human management. Only a small percentage of these plant assemblages can be considered sustainable solely on the basis of natural factors.

Xerothermic grasslands occur in several regions in Poland: along the lower and middle Oder River, the Toruń-Eberswalde Pleistocene ice sheet marginal streamway valley, the middle and lower Vistula River, in the regions of Lublin, Małopolska and Silesia; also in isolated sites in the Suwalki region and along the middle course of the Bug River. Generally these are small areas, rarely used today for agricultural purposes. They were formerly treated as lower quality pasture for domestic species able to consume lower quality fodder – sheep, goats, less often for cows and horses.



Xerothermic grasslands are one of the most species-rich, open habitats in Europe

WHAT ARE THE THREATS TO XEROTHERMIC GRASSLANDS?

In the last few decades, the drastic disappearance of xerothermic vegetation is being observed throughout Europe. Widespread changes in land use were found to be the major cause of this process, mainly the abandonment of extensive herding practices, afforestation and plowing, fertilizing and sowing more productive species, in other words, the intensification of agricultural production. This process is also very much in evidence in Poland. It is estimated that well-preserved sites of xerothermic grassland habitats in western Poland have shrunk to only 30% of their former area since the mid-1970s. If this process is not stopped, we can expect to see over 80% of today's sites with rare xerothermic species disappear, including the extinction of several species. Conservation is especially problematic for isolated patches within grasslands of a smaller size, far from settlements and with little chance of having their former agricultural use restored. There are many such sites, some of them are protected as reserves or environmental use areas, but they are disappearing at a fast pace because they are not being used or actively managed for preservation purposes.

The lower Oder River valley

WHERE WILL THE PROJECT TAKE PLACE?

Dolna Odra PLH320037

The Dolna Odra Natura 2000 site, with an area of almost 30,000 hectares, was established to protect an almost 90 km. long stretch of the Oder valley and its edge zone between Kostrzyn and Szczecin. This area has been naturalizing over the past few decades. It includes an extensive flood plain with oxbows, riparian forests, reed beds, lowland peat-bogs, fresh and wet meadows together with those of a fluctuating water regime, dunes and other valuable habitats.

The specific, warm – for this latitude – climate of the Oder River valley, low rainfall and high number of sunny days during the year provide the conditions needed to sustain the many xerophilous and thermophilous plants found in the edge zone. For centuries, azonal xerothermic vegetation grew on the steep, sunny slopes of this naturally meandering river's escarpments, the Oder River of days past. The escarpments and eroding slopes occurring along the river valley formed a natural ecological corridor, enabling thermophilous species to migrate and enrich their gene pool with other populations. After the river was regulated, such habitats slowly began to disappear, succumbing to natural succession, which led to the establishment of shrub and forest assemblages. At the same time, the hunger for land resulting from the unproductive farming of Europe at the turn of the century led to the cultivation of every possible plot of ground that could be put into production. Every available frag-

ment of the flatter moraine uplands was plowed, even the drained polders, whereas the escarpment slopes were used as pasture. Due to their steepness, sheep were usually put out to graze on the escarpments, less so goats. The extensive grazing of the Oder Valley escarpment halted ecological succession, enabling xerothermic assemblages to survive on its slopes.

River regulation and the retreat of its corridor from the foot of the escarpment made it possible to take economic advantage of the rich and easily accessible deposits of sand, gravel, and clay, whose many pits were established along the Oder's banks. To this day, many former pits remain, becoming excellent substitute habitats for xerothermic plants along the Oder due to their dry conditions, steep slopes and good sun exposure.

Paradoxically, then, on one hand humans halted the natural dynamic shaping the landscape of the river valley and its escarpments, but at the same time were instrumental in establishing substitute habitats that could be settled by thermophilous plant populations.

After World War II, the Oder Valley region depopulated, grazing practically disappeared and the xerothermic grasslands gradually began succumbing to successive growth. A significant portion, often very valuable patches of xerothermic grasslands, was afforested. Among the remnants of the Oder River valley's xerothermic plants, a small portion came under protection. One of the most valuable patches of thermophilous assemblages in the region is protected in the "Bielinek" Reserve. A patch of steppe vegetation is fairly well preserved thanks to the regular removal of woody growth within the borders of the "Wzgórze Widokowe nad Międzyodrzem" Reserve.

As part of this project, 13 main areas of concentrated xerothermic habitat sites have been designated for preservation activities, including:

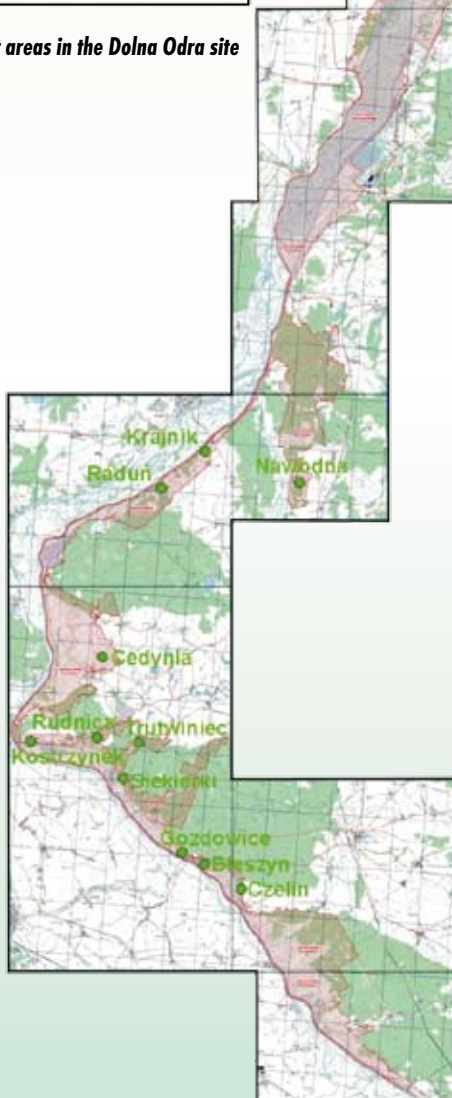
Kurów – This is the northern-most stronghold of thermophilous grassland habitat on the lower Oder River. It is one of the last patches of the formerly rich xerothermic plant complexes on the western Oder escarpment, most of which succumbed to afforestation or single family housing development. Its proximity to an urban agglomeration negatively impacts the state of the grassland. Due to surface spillage from silos and food manufacturing facilities built along the escarpment's crest, the grassland is undergoing eutrophication and becoming overgrown with *Rubus caesius*. Part of the slope was destroyed by gravel excavation (currently illegal). But the grassland has retained many xerothermic and thermophilous species, including: *Campanula sibirica*, *Veronica spicata* or *Potentilla arenaria*.



Xerothermic grasslands are also rich in animal life



Project areas in the Dolna Odra site



The grasslands in Kurów, though they do not have a concentration of many rare species, comprise a local refugium of thermophilous plants.

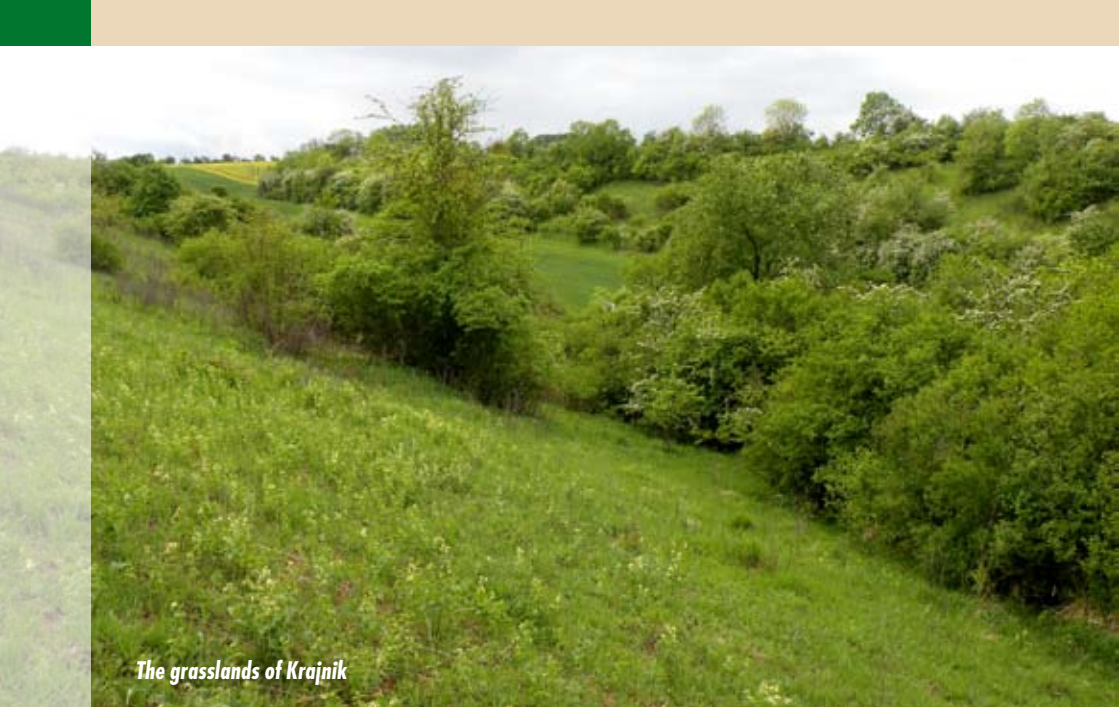
The existence of what is still a relatively well preserved patch of grassland decreases isolation and facilitates the migration of individual populations of xerothermic species in the Oder valley.

Moczyły – This is one of the few patches of xerothermic grasslands on the Oder River's western bank that has not been afforested or built-up. However, it is not grazed, so its northwestern part, with the character of a floristic steppe dominated by *Brachypodium pinnatum*, has been succumbing to succession and is becoming more of a thermophilous fringe assemblage of the *Trifolio-Geranietea* class. Shrubs of *Crataegus monogyna* and *Pinus sylvestris* saplings are infringing on the grassland. The more xerothermic western part of the grassland, characterized by a mosaic of *Stipa* and sandy thermophilous grasslands, is gradually being plowed, decreasing its total area from year to year. Despite the lack of individual legal protection, this site has maintained a rich and varied flora of rare and protected species, such as: *Stipa capillata*, *Campanula sibirica* or *Scabiosa columbaria*.

The lower Oder River valley



Krajnik – This is a group of three grasslands in the vicinity of Krajnik Dolny. The most valuable of these – „Żwirownia Krajnik” – is a mosaic of different, open, xerothermic vegetation as well as fringe assemblages. These grasslands are exceptionally short, rich in dicotyledonous species, such as *Scorzonera purpurea*, *Scabiosa canescens*, *Medicago falcata*, *Anthericum ramosum* or *Salvia pratensis*, giving them that special “floristic” character. The remaining two grasslands, comprising the western and eastern escarpment of a naturally eroding ravine, are somewhat poorer in species due to the well



The grasslands of Krajnik

advanced stage of ecological succession there. The great proportion of species here are of thermophilous fringe types, such as *Origanum vulgare* or *Galium verum*. Eventual grazing should halt or even reverse the succession processes and maintain the grasslands' biodiversity.

The grasslands near Krajnik are one of the most valuable sites of thermophilous plants in the lower Oder River valley. Despite its small size, it has many rare species.

As is the case with the remaining sub-areas in the Dolna Odra site, Krajnik is a refuge for thermophilous vegetation, surrounded by an intensively developed landscape of crop fields and settlements. For this reason, it has tremendous value in its contribution to increasing the biodiversity of the region.

Raduń – The area between Raduń and Zatoń Dolna includes the steep slopes of the Oder River valley and the moraine hills, which meet the river corridor almost perpendicularly here.

The area is known for its uniquely variable terrain. In some areas, the uplands reach to almost 100 meters above sea level at inclines of even 50°. The hills are mostly made up of silty clay, rich in calcium carbonate. Groups of large erratic boulders are visible on the surface in only a few places, and the area lacks smaller stones and gravel.

These abiotic conditions resulted in the development of a specific combination of rare plant assemblages of the most extreme habitat types, which occur in varying successive stages on the slopes near Raduń and Zatoń Dolna: xerothermic grasslands (*Linosyridi-Stipetum pulcherrimae*, *Potentillo-Stipetum* and *Adonido-Brachypodietum*), species rich xerothermic shrubs (*Querceto-Lithospermetum subboreale*) and riparian woods on the slopes (*Fraxino-Ulmetum*). Other habitats listed in Annex I of the Habi-

tats Directive are also found here: petrifying springs with tufa formation, lowland hay meadows, mixed oak-hornbeam forests and medio-european limestone beech forests.

A forest-steppe reserve near Raduń near Oder river was already proposed for this site about 50 years ago. At that time, this area was compared to the well-known reserve in Bielinek. The steep hill slopes right by Raduń near Oder river have long been known and valued as an exceptional site of xerothermic plants in the country. *Stipa pulcherrima* has been acknowledged as the most valuable flora element of this planned reserve. Currently, this is one of five existing sites of this rare grass in Poland. In 1960, this site was considered the country's largest uniform patch of xerothermic grassland dominated by *Stipa pulcherrima*. Other rare species found on the xerothermic slopes near Raduń are: *Anthericum liliago*, *Carex supina*, *Carex humilis*, *Oxytropis pilosa*, *Linosyris vulgaris*, *Campanula sibirica*, *Campanula bononiensis*, *Cephalanthera damasonium*, several species of broomrape (*Orobanche*), the spider *Atypus muralis*, the snail *Helicopsis striata*, several species of rare avian raptors and many others.

With this exceptional richness of species and habitats, the hills between Zatoń and Raduń fulfill a significant role in supporting a high level of biodiversity, not only on a regional scale, but also a national one, and even, given the presence of natural habitats and species here, on a European scale.

The main threat to the slopes between Raduń and Zatoń is forestry. Over the last few decades, a significant portion of the xerothermic grasslands found on the hillsides mentioned above have been afforested. Another threat is the abandonment of grazing in the non-forested habitats and the resultant natural succession that is occurring.

The entire area is found within the Cedyňa Landscape Park.



A mosaic of grasslands, shrubs and meadows near Raduń



Steep slopes with xerothermic grasslands in the vicinity of Raduń

Nawodna – This site includes a fragment of the Rurzyca River slopes transected by numerous small dry valleys. The entire area's substratum is mainly comprised of sand and sandy till. The soils that developed on these formations are either pod-

zolic or poor brown soils. Pararendzinas occur on the steep, sandy slopes rich in calcium.

The valley's slopes run north to south. They are, however, crisscrossed by many ravines and xerothermic grasslands have developed on the warmer slopes with a southern exposure. Most of the slopes were planted with trees in the 1970s. Currently, thermophilous non-forest plants occur in small, isolated but numerous patches surrounded by a monoculture of pine or cultivated and abandoned farm fields.

The xerothermic grasslands are mainly represented by the *Potentillo-Stipetum* association, more rarely by the *Adonido-Brachypodietum* grassland. In places, thermophilous *Festuco-Koelerietum* and *Sileno-Festucetum* grassland associations are also found on the loose sands of the xerothermic grasslands. In patches forested with pine, specific associations of *Pinus-Brachypodium pinnatum* have developed.

In the 1970s, the grasslands near Nawodna were still considered one of the largest, species-rich assemblages of xerothermic plants in Pomerania. Despite afforestation, well preserved patches of xerothermic grasslands have survived here, as well as sites with rare species that found a place for themselves in the undergrowth of the pine plantations and at the edges of fields. This shows the great natural potential that still exists in this area. *Anthericum liliago* is among the plants occurring here listed in the Polish Red Data Book of Plants. Other rare and protected species are: *Stipa capillata*, *Gentiana cruciata*, *Dianthus arenarius*, *Campanula sibirica*, *Oxytropis pilosa*, *Stachys recta*, *Odontites lutea* and many more.

The main threats to the thermophilous plants near Nawodna are afforestation, illegal sand excavation and illegal trash disposal.

Cedynia – This site is on the side of a small ravine crossing the slope of the Oder valley. This southern-exposed slope has an incline of 30° to 40° and is mainly built on



One of the grasslands near Nawodna



Salvia pratensis



Stipa pulcherrima

clay till. Initially, brown and, in places, pararendzina soils developed on this type of substratum.

The prevailing types of vegetation here are the *Stipa* xerothermic grassland associations of *Potentillo-Stipetum*, *Linosyridi-Stipetum* and the *Adonido-Brachypodietum* xerothermic grassland. Thermophilous blackthorn and hawthorn shrubs grow only on the eastern side of the slope. Their expansion to other areas of the site is the main threat to this grassland near Cedynia.

Despite their lack of use and small area, the grasslands near Cedynia are fairly well preserved. Additionally, they represent the rarest and most extreme habitat type of *Stipa* grassland – with *Linosyris vulgaris* and *Stipa pulcherrima*.

The following species, rare in Poland, also occur here: *Stipa capillata*, *Linosyris vulgaris*, *Stipa pulcherrima* and *Prunella grandiflora*.

The terrain is unused, with only the crest of the slope planted with fir (a Christmas tree plantation). The main threats are natural succession and more recently, plowing of the slope's lower portions.

The entire area is part of the Cedynia Landscape Park.

Kostrzynek – Kostrzynek includes a fragment of the Oder River valley slope that is transected by ravines of varying sizes. The prevailing types of substrate are glacial sands and sandy till, with an admixture of small-grained gravel in places. Areas planted in pine have developed podzolic soils, with poor brown soils present in some areas, whereas pararendzina occurs on some of the slopes.

Stipa grasslands of the *Potentillo-Stipetum* association have formed on the open, warm ravine slopes and abandoned pit sites found here, along with the thermophilous, sandy grassland association of *Sileno-Festucetum* and *Festuco-Koelerietum*. Patches of grassland reach a maximum size of 3 ha and are scattered over the entire area.

As with most of the Oder River valley areas included in the project, the grasslands around Kostrzynek are a refugium of xerothermic plants surrounded by agricultural fields and tree plantations. They significantly increase the region's biodiversity. Some of the patches are well preserved and exhibit a character typical of the xerothermic grasslands in northwestern Poland. They include sites with such rare and protected species as: *Stipa capillata*, *Stachys recta*, *Odontites lutea*, *Gentiana cruciata*, *Helicopsis striata* and many others.

The main threats to the thermophilous non-forested habitats of Kostrzynek are afforestation and natural succession.

The entire area is within the Cedynia Landscape Park, and the Mieszkowice Forestry Division designated two sites - „Murawa pod Kostrzynkiem” and „Kartuzek” - as site of ecological interest.



Rudnica – This sub-area is in the valley of a small tributary of the Oder River. Its slopes are mainly comprised of glacial sands, on which podzolic soil developed, and some areas are richer in calcium carbonate – the pararendzina soils. The slopes are generally not very high, with inclines varying from 20° to 40°, and their exposure is mainly south and southwest.

Most of the slopes are forested, but some of them still have patches of *Stipa* grasslands of the *Potentillo-Stipetum* associations and the thermophilous *Festuco-Koelerietum* and *Sileno-Festucetum* sandy grasslands. They may be small, but are rich in rare species. In several cases, these

Xerothermic grasslands near Kostrzynek

assemblages have recolonized former excavated pit sites.

Despite their small size and extreme isolation, several of these patches contain some very rare species for the country. The largest of four known sites of *Stipa borys-thenica* in Poland (a species in the Polish Red Data Book of Plants) is found in the Rudnica sub-area. Other rare and protected plants also found here include: *Stipa capillata*, *Linosyris vulgaris*, *Thesium linophyllum*, *Ononis spinosa*, *Primula veris* and *Odontites lutea*. Of particular note is the thermophilous fauna that occurs here, with, among others, the following listed in the Polish Red Data Book of Animals: *Eresus cinnaberinus*, *Atypus muralis* and *Helicopsis striata*.

The main threats are the extreme isolation of the patches and afforestation, as well as natural succession.

The entire area is in the Cedynia Landscape Park, and one of the grasslands - „Na nieużytku” - was designated an environmental use area by the Mieszkowice Forestry Division.

Trutwiniec – As with Rudnica, Trutwiniec consists of the valley of a small Oder tributary. Its slopes are mainly comprised of glacial sands with podzolic soils and some patches richer in calcium carbonate with pararendzina soils. The slopes are not very high, with inclines of 20° to 40° mainly facing south and southwest.

Most of the slopes are forested, but some still maintain patches of *Stipa* grasslands of the *Potentillo-Stipetum* association and the thermophilous *Festuco-Koelerietum* and *Sileno-Festucetum* sandy grasslands. They may be small, but are rich in rare species. In several cases, these assemblages have recolonized former excavated pits and the embankments constructed along railways and roads.

Despite their small size and extreme isolation, some of these patches contain some very rare species for the country. One of four known sites in Poland of *Stipa borysthena* is found here, as well as *Anthericum liliago* and *Carex supina* – all these species are listed in the Polish Red Data Book of Plants. Other rare and protected plants occurring here include: *Stipa capillata*, *Scorzonera purpurea*, *Pulsatilla pratensis*, *Ononis spinosa*, *Avena pratensis*, *Primula veris*, and *Odontites lutea*. Also of particular note are the thermophilous fauna that occur here, among others *Atypus muralis* and *Helicopsis striata*, which are listed in the Polish Red Data Book of Animals.

The main threats are the extreme isolation of the patches and the incursion of *Robinia pseudoacacia* into the area.

The entire area is within the Cedyňa Landscape Park.

Siekierki – This is a small fragment of an Oder River valley hillside. The slope has a southwestern exposure and is inclined at about 40°. It is made up of glacial sands rich in calcium carbonate.

The site constitutes a gap in the pine stand. It is entirely made up of *Stipa* grasslands of the *Potentillo-Stipetum* association.

This small area is highly significant in preserving the biodiversity, not only of the region, but of the entire country. It is one of four sites with the rarest *Stipa* in Poland – *Stipa borysthena*. Additionally, *Anthericum liliago* and *Stipa capillata* are found here.



Post-mining excavation near Rudnica with sites of thermophilous sand calcareous grasslands and xerothermic grasslands.



Scorzonera purpurea



Anthericum liliago

The main threat to the site is the incursion of *Robinia pseudoacacia*.

The entire area is in the Cedyňa Landscape Park.

Gozdowice – Here we have a high (about 40 m) and steep slope of the Oder River valley with a southwestern exposure. The slope was formerly an excavated pit site and has an incline of 40°, and even 50° in some places. It is built on sandy till.

The main plant types here are *Stipa* grasslands of the *Potentillo-Stipetum* association. Despite the lack of use, it is in good condition, with individual shrubs and fruit trees found in only a few locations.

The slope near Gozdowice has one of the best preserved patches of xerothermic grasslands in the Oder River valley. It is a model site for this habitat. Among the rare species occurring here are: *Stipa capillata*, *Odontites lutea*, *Ononis spinosa*, *Carex supina* (a species in the Polish Red Data Book of Plants) and *Stachys recta*. This sub-area also has two species in the Polish Red Data Book of Animals: *Atypus muralis* and *Helicopsis striata*.

An environmental use area known as “Murawa ostnicowa” is found on most of the grassland, with the remaining portion comprising a gap in the pine stand. Its main threat is the incursion from the crest of *Calamagrostis epigeios* – an expansive stolonate grass.

The entire area is in the Cedyňa Landscape Park.

Bleszyn – This high (about 40 m), steep and partly unstable slope of the Oder River valley has a southwestern exposure. As with Gozdowice, Bleszyn has long been an

The Oder River Valley at Gozdowice



abandoned excavation pit, characterized by steeply inclined terrain. It is made up of glacial sands.

Bleszyn consists of the *Stipa* grassland *Potentillo-Stipetum* association, thermophilous sandy grasslands and thermophilous shrubs of the *Berberidion* association.

The slope at Bleszyn is one of the most valuable patches of xerothermic grasslands in the lower Oder valley. Among the rare species occurring here are: *Stipa capillata*, *Odontites lutea*, *Ononis spinosa*, *Carex supina* (a species in the Polish Red Data Book of Plants), *Stachys recta*. Bleszyn is also the site for two species in the Polish Red Data Book of Animals: *Atypus muralis* and *Helicopsis striata*.

The entire site is an environmental use area called “Murawa Bleszyńska” and within the boundaries of the Cedyna Landscape Park. Its main threat is the expansion of *Robinia pseudoacacia*.

Czelin – This large grassland complex (about 15 ha) is located in a naturally eroding ravine at the edge of a ground moraine along the Oder River valley near the village of Czelin. The sandy slopes of the ravine with their southern exposure are covered by *Stipa* grasslands dominated by *Stipa capillata* and *Potentilla arenaria*, with many colorful flowering species, such as *Dianthus carthusianorum*, *Melampyrum arvense* or *Veronica spicata*. Unfortunately, due to the lack of grazing, the grasslands have become largely overgrown, mainly with blackthorn brush. A “floristic steppe” with one of the largest populations of *Campanula sibirica* has developed on the westerly exposed slopes, in part due to the milder moisture regime and a greater proportion of suspended fraction in the substratum. Patches of thermophilous inland sandy grasslands have developed in the remains of the gravel pits in the southern part of the complex, mainly of *Sileno otitis-Festucetum* association, that is clearly evolving in the direction of a *Stipa* grassland.

The *Stipa* grassland in Czelin

Campanula sibirica and *Linum austriacum*



Papilio machaon

Ujście Warty PLCo80001

The Ujście Warty Natura 2000 site is at the mouth of the Warta River. With a size of 33,297.35 ha, it was established to protect both a bird sanctuary as well as the natural habitats of the area.

It includes a broad floodplain formed by the confluence of three rivers: Warta, Oder, and the smallest of the three – Postomia. It is a huge complex of extensively used humid meadows, well-hydrated rushes, oxbows, ponds, willow scrub, various types of riparian forests, alder and oak-hornbeam woods. The Warta Mouth National Park, formerly the Słońsk Nature Reserve that is part of the Natura 2000 site, is one of the most valuable wetlands in central Europe. At least 35 bird species listed in Annex I of the Birds Directive occur here. Among the many species inhabiting this area during breeding season are: Shelduck *Tadorna tadorna*, Greylag goose *Anser anser*, Northern shoveler *Anas clypeata*, Spotted crane *Porzana porzana*, Gadwall *Anas strepera*, Great egret (*Ardea alba*), Eurasian coot *Fulica atra*, Black-winged stilt *Himantopus himantopus*, Eurasian oystercatcher *Haematopus ostralegus*, Common redshank (*Tringa totanus*), Tufted duck *Aythya fuligula*, Little gull *Larus minutus*, Little tern *Sterna albifrons*, White winged tern *Chlidonias leucopterus*, Black tern *Chlidonias niger*, Aquatic warbler *Acrocephalus paludicola*, Common pochard *Aythya ferina*, Common snipe *Gallinago gallinago*, Black-headed gull *Larus ridibundus*, White stork *Ciconia ciconia*, Black stork *Ciconia nigra*, Corn crane *Crex crex*, Red-backed shrike *Lanius collurio*, Barred warbler *Sylvia nisoria*, Tawny pipit *Anthus campestris*, Bluethroat *Luscinia svecica*, Wood lark *Lullula arborea*, Ortolan bunting *Emberiza hortulana*, Common crane *Grus grus*, Mute swan *Cygnus olor*, Grey heron *Ardea cinerea* and many others.

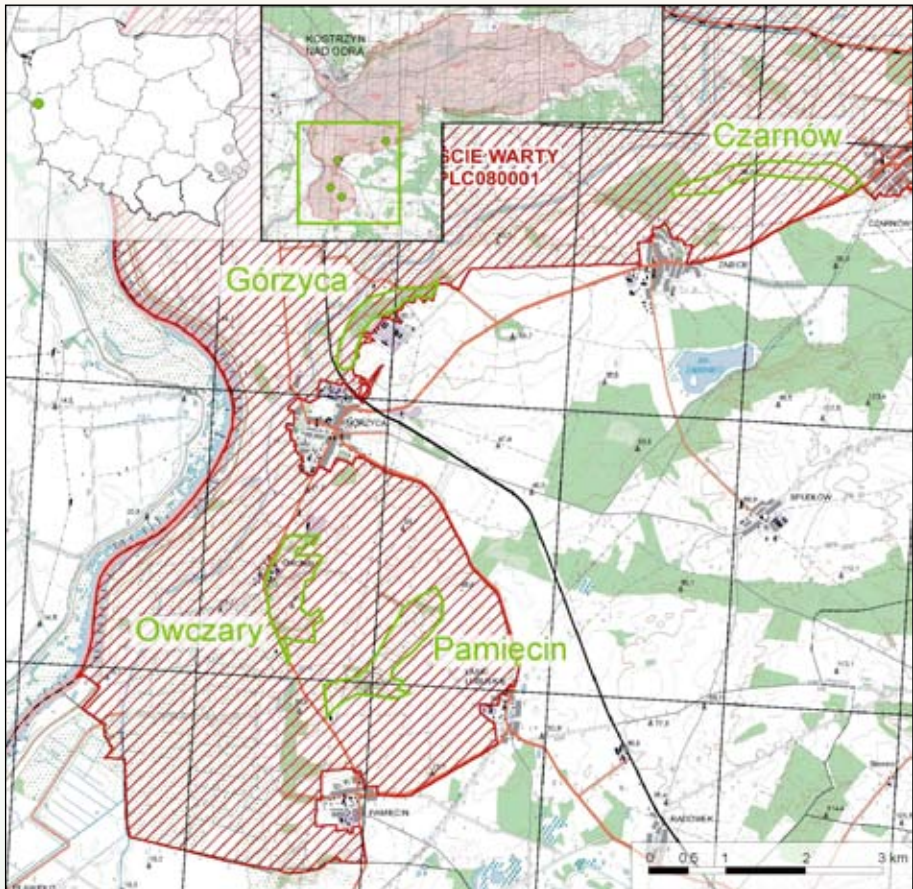
The reserve has 11 natural habitats listed in Annex II of the Habitats Directive. The best represented among them, are: oxbows and natural eutrophic ponds; rivers with muddy banks with *Chenopodium rubri* and *Bidention* vegetation; hydrophilous tall herb fringe communities of plains and of the montane to alpine levels; alluvial forests of willow, poplar, alder and ash, as well as xerothermic grasslands.

Adjacent to the Warta Mouth National Park are other important natural areas with some form of protection: part of the Warta Mouth Landscape Park, the „Lemierzyce”, „Pamięcin” and „Dolina Postomii” nature reserves, as well as the Słońsk Ramsar-listed sanctuary and several environmental use areas.

In addition to extensive wetlands, the area includes many sites with thermophilous vegetation at the edges of the Oder and Warta river valleys. The best preserved complexes of xerothermic grasslands, fringe and thermophilous plants, as well as forested slopes are found in the southern part of the area near Górczyca, Owczary, Pamięcin and Laski Lubuskie.

Four main areas of concentrated xerothermic habitats have been designated for conservation activities as part of the project.

Czarnów – This area is a fragment of the Oder valley’s gentle slopes that run between the villages of Żabice and Czarnów. The slopes face in a northerly direction with



Project sub-areas at the mouth of the Warta River area – Czarnów, Górzyca, Owczary and Pamięcin

inclines of 20° to 30°. They are transected by small ravines, where xerothermic grasslands evolved. Brown soils developed on a substratum of sandy till.

The slopes are about 50% covered by thermophilous shrubs and pine trees with thermophilous species as ground cover. Non-arboreal assemblages are represented by the aforementioned xerothermic grasslands, as well as thermophilous sandy grasslands and fresh meadows with a large proportion of xerothermic species.

The Czarnów sub-area does not have many rare xerothermic species. However, it is a natural sanctuary of thermophilous habitats in the valley of a large river. It significantly increases the biodiversity of the surrounding agricultural landscape and decreases the isolation of xerothermic species' populations. Of the more interesting species that occur here are: *Pulsatilla pratensis*, *Primula veris*, *Silene otites* and *Helichrysum arenarium*.

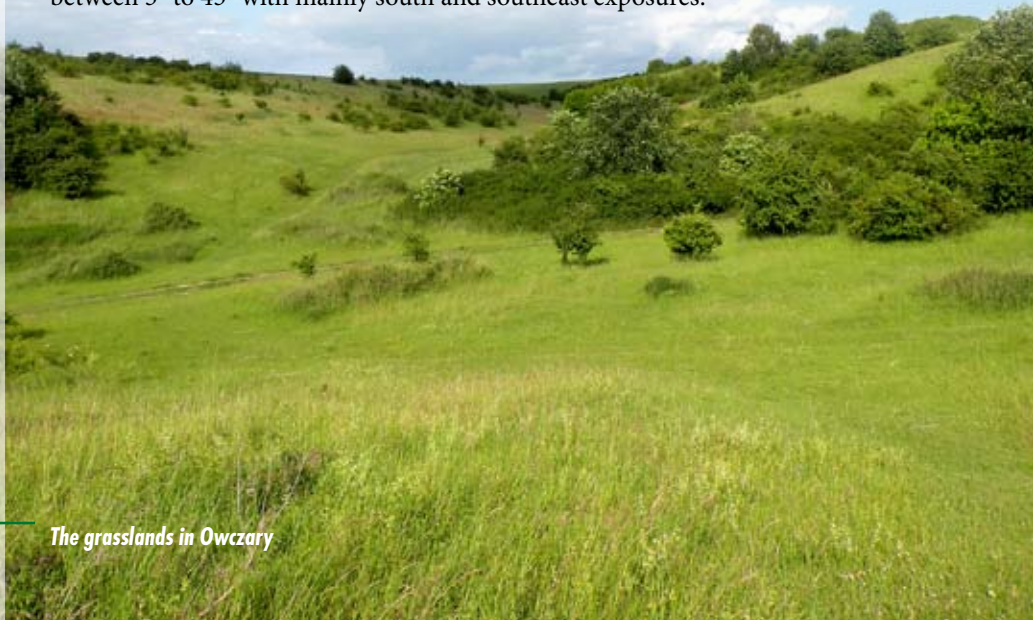
The main threats to Czarnów are natural succession and afforestation. Two environmental use areas are found on the slopes of this site - „Długa Murawa” and „Murawka”. The entire area is also part of the Warta Mouth Landscape Park.

Górzycza – This site includes a fragment of the Oder River valley’s edge with a northern and western exposure at inclines of 20° to 40°. Small erosional ravines cut across the area. Brown soils developed on the slopes of sandy till.

Thermophilous shrubs, pine plantations and deciduous forests with thermophilous species growing as ground cover comprise 60% of the slope. Non-arboreal assemblages are represented by xerothermic grasslands of the *Potentillo-Stipetum* and *Adonido-Brachypodietum* associations, as well as the *Sileno-Festucetum* thermophilous sandy grasslands. One of the more valuable thermophilous plant complexes in the area, it represents typical examples of xerothermic grasslands. The dynamic mosaic of grasslands, fringe, shrubs and thermophilous forest species significantly increases the biodiversity of the surrounding agricultural landscape. Among the rare species occurring here are: *Stipa capillata*, *Eryngium campestre*, *Prunella grandiflora*, *Melampyrum arvense* and *Campanula sibirica*.

The main threats are natural succession and afforestation, as well as trash dumping by local residents. The slopes are also irregularly burned by the residents, which significantly delays the process of succession and as a result, benefits the maintenance of the grassland. Proposals have been made many times to put the site under protection as an environmental use area. The entire area is also part of the Warta Mouth Landscape Park.

Owczary – This site is comprised of a cluster of ravines cutting across the slopes of the Oder River valley. It is characterized by a very diverse terrain. The slopes’ inclines vary between 5° to 45° with mainly south and southeast exposures.



Brown soils rich in calcium carbonate developed on slopes of clay till.

The vegetation is a dynamic mosaic of thermophilous habitats, from *Adonido-Brachypodietum* and *Potentillo-Stipetum* association xerothermic grasslands, *Sileno-Festucetum* thermophilous sandy grasslands and thermophilous species of the *Arrhenatherion* alliance meadows, to fringe and shrub species, *Fraxino-Ulmetum* riparian forests on the slopes, thermophilous oak groves and *Pinus-Brachypodium pinnatum* woodlands.



This is undoubtedly one of the best

preserved and largest complexes of thermophilous vegetation in Poland. It is a model example of habitats 6210 and 91F0. Thanks to the grazing that has continued here for years, the grasslands have been preserved in an ideal state. Many rare species occur here: *Stipa joannis*, *Anthericum liliago*, *Eryngium campestre*, *Orobanche caryophyllacea*, *Campanula sibirica*, *Campanula bononiensis*, *Scorzonera purpurea*, *Stipa capillata*, *Thesium linophyllum*, *Oxytropis pilosa*, *Helicopsis striata* and many others.

54% of this area is privately owned by the Naturalists' Club. The remainder is owned by the State Treasury and managed by the Agricultural Property Agency. Extensive grazing by sheep, horses and goats occurs on 75% of the area. Mowed meadows comprise 10%. A small fragment consists of an agricultural field used to raise rare species of weeds. The entire area can be considered the Naturalists' Club's private reserve, under its care for over the past dozen or so years. Two environmental use areas are found in the segment owned by the National Treasury: „Owczary I” and „Owczary II”.

The site is threatened in places by the encroachment of *Robinia pseudoacacia*.

Pamięcin – Pamięcin includes the lower stretch of an extensive dry valley directly connected to the Oder River valley. The valley is transected by many ravines running east to west. Xerothermic vegetation often covers these fairly steep and high slopes. The remaining, flatter area is used mainly as agricultural fields.

The thermophilous vegetation covering almost 50% of the terrain is represented primarily by the *Potentillo-Stipetum* and *Adonido-Brachypodietum* associations, thermophilous sandy grasslands, thermophilous shrubs and *Fraxino-Ulmetum* riparian woods on the slopes.

Next to Owczary, this is the second most valuable xerothermic grassland complex in the region. Model and exceptionally species-rich patches of habitat 6210 are found within its borders.

Many rare species grow here: *Stipa joannis*, *Anthericum liliago*, *Eryngium campestre*, *Orobanche caryophyllacea*, *Campanula sibirica*, *Campanula bononiensis*, *Stipa capillata*, *Thesium linophyllum*, *Oxytropis pilosa*, *Helicopsis striata* and many others.



Grasslands in the Pamięcin reserve



Xerothermic grasslands in the Laski II environmental use area

About 50% of this sub-area is owned by the State Treasury and managed by the Agricultural Property Agency. There are two environmental use areas here - „Laski I” and „Laski II” – as well as the „Pamięcin” reserve. A small fragment of the State Treasury owned land is administered by the State Forests National Forest Holding (Ośno Lubuskie Forestry Division). The remaining terrain is privately owned and 99% of it is intensively cultivated for agricultural use. The entire area is within the borders of the Warta Mouth Landscape Park. Its main threats to the non-arboreal xerothermic vegetation here is the spread of thermophilous shrubs, the encroachment of *Robinia pseudoacacia* and biogenic runoff from the cultivated farm fields.

Stawska Góra

The Stawska Góra site PLH 060018 is located in the Chełm Hills region (eastern part of the Lublin Upland), about 8 km northwest of Chełm and 1.5 km from the village of Staw. It encompasses part of the Upland’s peaks known as Góra Czubatka and



Stawska Góra site



Carlina onopordifolia



Borders of the project site at Stawska Góra (green line)

is entirely within the floral reserve created to preserve its steppe vegetation. The area of the reserve is part of State Treasury lands managed by the Chełm Township authorities. The reserve is 4.9 ha in size.

The greatest treasure of this small site is *Carlina onopordifolia*. This is only one of two places where this plant occurs in the Lublin region and one of five known throughout Poland. The existence of *Carlina onopordifolia* at Stawska Góra was already cited in the literature in 1881, whereas the reserve was established in 1956.

Along with *Carlina onopordifolia*, other thermophilous and calciphilous steppe species comprising the xerothermic grasslands are also protected in the reserve. The grasslands themselves, due to great anthropomorphic pressure, do not form typical grassland species' assemblages here, but are nonetheless characterized by great species richness. A total of 210 plant species have been confirmed on the reserve, including 30 acknowledged as rare and 8 under strict legal protection: *Carlina onopordifolia* and *Carlina acaulis*, *Adonis vernalis*, *Anemone sylvestris*, *Aster amellus*, *Aquilegia vulgaris*, *Prunus fruticosa*, *Gentiana cruciata*. Three are partially protected: *Primula veris*, *Viburnum opulus* and *Frangula alnus*. Additionally, *Prunus fruticosa*, *Carlina onopordifolia* and *Senecio macrophyllus* are listed in the Polish Red Data Book of Plants.

The xerothermic grasslands contain rich faunal life. 600 species of various systematic groups have been found in this small area. Among them are 27 listed in the Polish Red Data Book of Animals as nearly extinct or threatened. The most numerous species' group are the invertebrates, with the butterflies being the best studied among

them. Over 300 butterfly species have been observed here, with two under protection: *Papilio machaon* and *Proserpinus proserpina*, while others are rare, occurring in only a few known areas in Poland. Most of the reserve's rare invertebrate species are limited in their ability to spread and have survived here because the appropriate conditions of their steppe-like micro-habitats have continued to exist.

The main threat to the rare forms of plants and animals in this area is natural succession. In the past, a fragment of the grassland was used as pasture, which minimized the growth of shrubs and trees. After grazing ceased, the expanding growth of shrubs and trees made it impossible for the photophilous steppe vegetation to grow and it began to disappear. This area must be actively managed in order to maintain the habitat of the many rare steppe species occurring here.

Niedzieliska

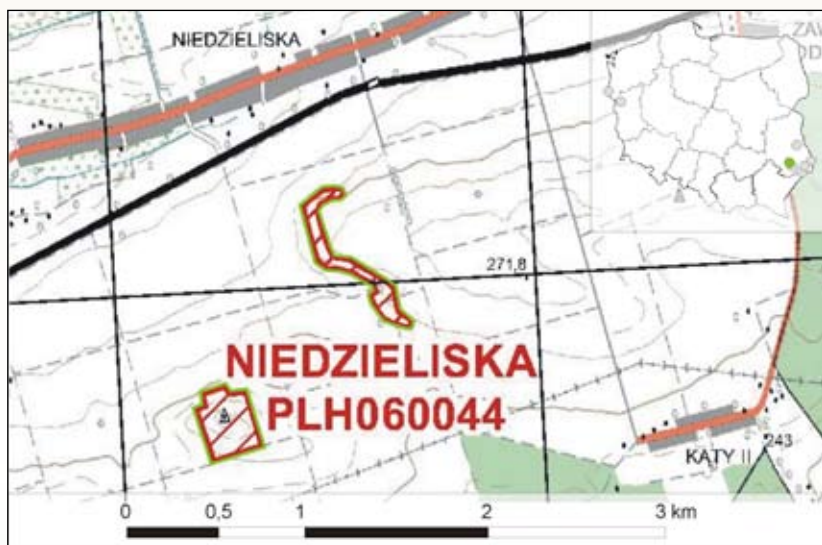
The Niedzieliska site PLH060044 of 7.39 ha was established to protect assemblages of xerothermic vegetation growing on two hummocks surrounded by agricultural fields. It is located in the vicinity of the Wieprz River valley, about 2 km south of the buildings of Niedzieliska village. This site is located in the Zamojski Padół meso-region of the Lublin Upland. In terms of its administration, the site is in Zamojski County and the Szczepieszyn Township. A natural monument of xerothermic vegetation of about 0.16 ha, known as Dziewcza Góra hill (272 m a.s.l.), was established on the top of one of the rises in 1992. It was not until the beginning of the 21st century that this site of shrubs and grasslands and the sunny slopes of the neighboring, nameless hill were carefully studied, revealing their high natural qualities. This area has also been incorporated into the boundary of the Niedzieliska sanctuary.

Among the habitats found here under special legal protection in the European Union, the most valuable are the assemblages of xerothermic grasslands and the *Juniperus communis* shrubs growing on the xerothermic grasslands. Twelve species of protected plants occur here. *Anemone sylvestris* is one often found in these grasslands. Other protected plant species found here include: *Prunus fruticosa*, *Aster amellus*, *Gentiana cruciata* and *Rosa gallica* – listed in the Polish Red Data Book of Plants.

In the 1990s, a shrinking colony of *Spermophilus suslicus* was observed in the immediate vicinity among the fields. Aside from these observations, the site's fauna is poorly known. The protected butterfly - *Papilio machaon* - is often seen here.

Most of the site was formerly used for farming or to excavate lime. After this was abandoned due to the low fertility of the rocky rendzina soils, grassland and shrub assemblages developed. Currently, species of *juniperus*, *prunus* and *liguster* dominate, among others, and in some places grow too densely for light-demanding plant species to develop. Also, trash is illegally dumped in the thick scrub, while grassland fragments deemed useless for agricultural purposes are planted with trees. As part of "Conserva-

tion and restoration of xerothermic grasslands in Poland – theory and practice” project, the densest stands of shrubs will be thinned where protected plant species occur and the trash dumps will be eliminated.



The project area in Niedzieliska (green line)

The Niedzieliska area





Anemone sylvestris

Kąty

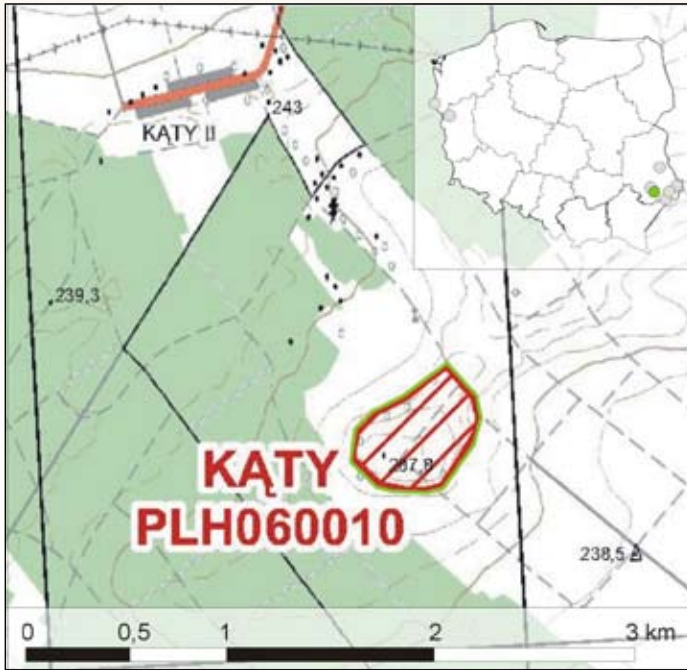
Ostoja Kąty PLH060010, with an area of 24 ha, was established to protect the slopes of a hill known as Wieprzecka Góra (287 m a.s.l.) surrounded by farm fields between the villages of Kąty II and Wychody. The rise is located in the Zamojski Padół meso-region of the Lublin Upland. It is administered by the township of Zamość (Zamojski County). Due to the presence of rare plant species, a natural monument was established here of 1.97 ha. Unfortunately, plans to create the Wieprzecka Góra Nature Reserve have not been realized.

This area is dominated by floristic xerothermic grasslands with significant stands of orchids. With its 26 species on the list of plants under legal protection, Kąty is probably the most valuable of these types of sites in Poland. Six of the species found here are listed in the Polish Red Data Book of Plants. Numerous individuals can be found here of: *Anemone sylvestris*,

Aster amellus, *Linum flavum*, *Platanthera chlorantha*, *Gentianella lutescens* and others. Several species lacking protection that are worth mentioning include: *Astragalus onobrychis*, *Trifolium rubens* and *Peucedanum alsaticum*, with one of its largest populations at this site in the country.

The vertebrate fauna of Kąty is relatively poorly known. Among the invertebrates found here, attention is drawn to the rare and protected butterfly species of *Colias myrmidone* and *Papilio machaon*. With the appropriate rainfall in spring, the showy sporocarps of the mushroom *Morchella esculenta* can be found in the grasslands and along roadsides.

The southern slopes of Wieprzecka Góra were used in the past for agricultural purposes. Today they are being overgrown by young xerothermic species. Some fragments of the slopes are burned. The northern and northwestern exposed slopes are in



The project area in Katy (green line)



Gymnadenia conopsea



Morchella esculenta



Trifolium rubens

large part overgrown with young pines and blackthorn. Given such unfavorable conditions, the plants requiring exposure to direct sunlight are disappearing. Another threat is the widespread incursion of humans who pick or dig up decorative species of plants. Some grassland fragments are also plowed or littered with trash. Protection of this site

Juniper shrubs at Żurawce



is made difficult by the complicated ownership structure of this land.

Żurawce

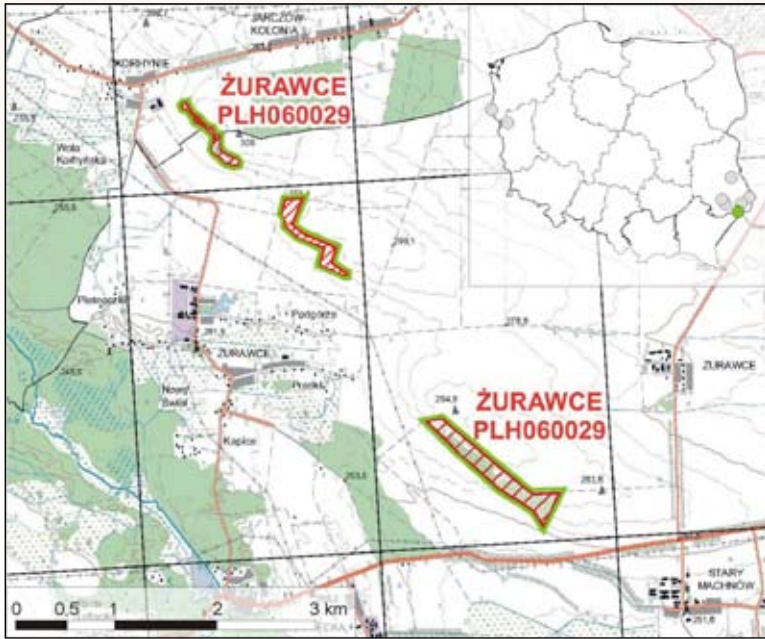
Established in an area of 35.9 ha, the site at Żurawce PLH060029 protects the slopes of three rises in arable land located near the settlements of Korhynie, Żurawce and Machnów Stary. The Żurawce site is situated on the border of the Middle Roztocza and Small Polesia regions, but in terms of administrative responsibility, it is in Tomaszów Lubelski County in the Jarczów and Lubycza Królewska Townships. The value of its natural qualities was recognized only in the 1990s. Actions were immediately taken to protect the most valuable sections of habitat. Currently, there are two environmental use areas here („Korhynie” and „Żurawce”) as well as a nature reserve („Machnowska Góra”). Several additional environmental use areas are planned in the neighboring vicinity.

The floristic xerothermic grasslands with significant stands of orchids (code 6210) and the *Juniperus communis* formations on the xerothermic grasslands (code

5130) are the most valuable natural habitats found here under European Union legal protection. They grow on the partially eroded, sunny, calcareous slopes. This site includes 20 plant species under legal protection. Among them are: *Anemone sylvestris*, *Aster amellus*, *Orobanche alba*, *Platanthera chlorantha*, *Listera ovata* and *Muscari comosum*. Other xerothermic species found here that are worth noting, though unprotected, include *Astragalus onobrychis* and *Peucedanum alsaticum*.

The fauna at this site has been the subject of many studies. *Sicista subtilis* has been confirmed at Machnowska Góra, one of the rarest rodents living in Poland. The invertebrate fauna is well known here, with some species found only at this site. Among the most valuable are: *Polyommatus icarus*, *Phengaris rebeli* (formerly *Maculinea rebeli*) and *Colias myrmidone*.

Papilio machaon also is seen frequently. An historic item of interest at the hills of Żurawce is the bunker that was once part of the “Molotov Line”.



The project area in Żurawce (green line)

A significant portion of the area was formerly used as cultivated fields with xero-thermic vegetation growing in the balks. After farming was abandoned due to the poor quality of the rocky, chalky rendzina soils, thermophilous plants returned to the abandoned fields. The wastelands of Machnowska Góra were afforested, worsening conditions for the flora species found here. In order to improve conditions, “*Conservation and restoration of xerothermic grasslands in Poland – theory and practice*” project will gradually remove trees from the nature reserve.



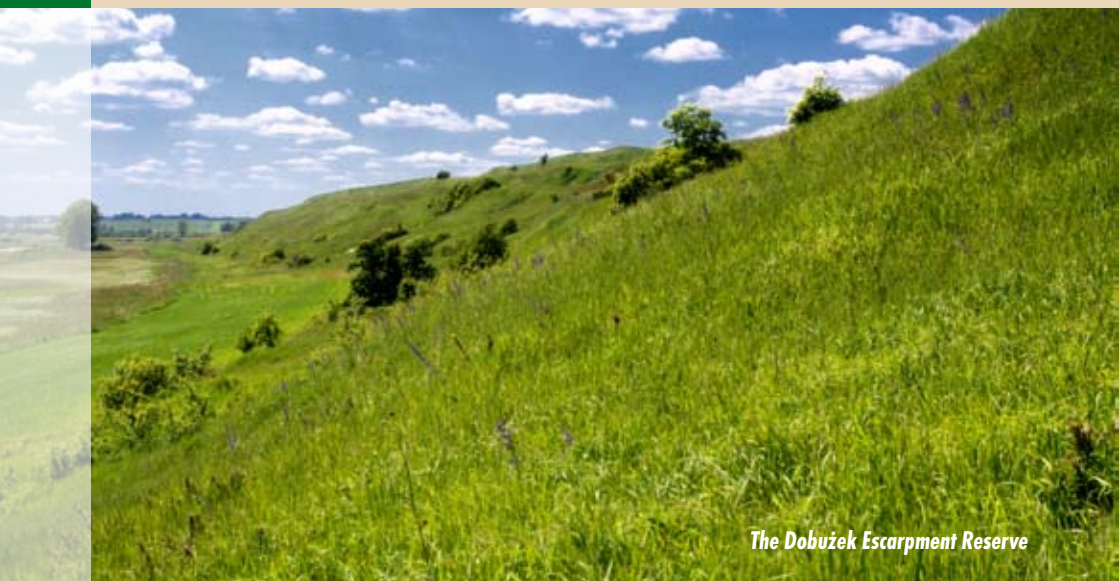
Muscari comosum



Typical agricultural landscape of the Lublin region



Aster amellus



The Dobużek Escarpment Reserve

Dobużek

Ostoja Dobużek PLH060039 of 199.3 ha in size was established to protect part of the Huczwa River valley with humid meadows and xerothermic grasslands growing on its steep, southern exposed slopes about 1 km. northwest of the village of Dobużek. This area is in the Zachodniowołyńska Upland in the Grzędy Sokalska meso-region. It lies entirely within the administrative boundaries of Tomaszów Lubelski County (Tyszowce Township). The great value of the thermophilous plant assemblages here was already recognized in the 1950s, but it wasn't until 1989 that the 5.07 ha “Skarpa Dobużanska” nature reserve was created. It is currently entirely within the boundaries of a Natura 2000 site.

Among the habitats found here under special legal protection in the European Union, the most valuable are the assemblages of xerothermic grasslands (code 6210) growing on the partially eroded slopes that have great value for the landscape. Seven plant species under protection in Poland grow here. One can find *Achillea setacea* here, growing in only two sites in the region. Great masses of *Aster amellus* grow here, as well as other commonly found species typical of xerothermic



Celastrina argiolus



The project area in Dobużek (green line)

grasslands, including: *Anthericum ramosum*, *Verbascum phoeniceum*, *Salvia pratensis*, *Prunella grandiflora* and others.

The fauna at this site was studied in the 1970s and 1980s, when *Mustela eversmanii* and *Spermophilus suslicus* were observed. *Spermophilus suslicus* had a small colony here then, which has not been able to be confirmed since despite searches. *Mustela eversmanii* probably no longer exists in Poland. Among the invertebrates, *Papilio machaon* can be seen here, as well as some of the more common species, such as *Vanessa cardui* and *Plebeius argyrognomon*

The area of the reserve was formerly used as agricultural fields. The fallow fields were quickly taken over by xerothermic vegetation. After the reserve was created, grazing was abandoned, resulting in the overgrowth of ground covers and blackthorn. This caused several previously present species requiring unobstructed sunlight to die out, such as *Iris aphylla*, and among the animals, *Spermophilus suslicus*, whose occurrence is strictly connected to the presence of grazed pastures.

Zachodniowołyńska Dolina Bugu

The Ostoja Zachodniowołyńska Dolina Bugu site PLH060035, with an area of 1556.1 ha, was established mainly to protect a fragment of the Bug River valley with its oxbows, humid meadows and riparian forests. In a stretch of the valley between the villages of Czumów and Gródek, the steep loess slopes are inhabited by thermophilous plants. These slopes lie in the Hrubieszów Basin (Zachodniowołyńska Upland) in Hrubieszów Township (Hrubieszów County). Several of the most valuable fragments were put under protection in 1960 in the form of a natural monument as a 0.27 ha stand of xerothermic vegetation, and then in the 1990s in the form of the „Błonia Nadbużańskie” environmental use area. A plan to create a reserve on the site of the environmental use area was unsuccessful.

The loess slopes of the Bug River valley are places where floristic xerothermic grasslands (code 6210) occur. Thirteen plant species under protective status have been noted here. Among the most valuable is *Chamaecytisus albus*, listed in the Polish Red Data Book of Plants. This is the only known site of this species in the country. Additionally, other protected species found here are: *Gypsophila paniculata*, *Prunus fruticosa*, *Scorzonera purpurea*, *Primula veris* and others. Other plant species present here but lacking legal protection include: *Peucedanum alsaticum*, *Libanotis pyrenaica* and *Salvia nemorosa*. The greatest feature of interest in the fauna of „Błonia Nadbużańskie” is *Spermophilus suslicus*, still living here in scattered colonies among the arable land. It formerly inhabited the extensive pastures in the river valley, but the Bug River's spring flooding destroyed much of the population. Noteworthy among the invertebrate fauna is the colorful representative of the moth family seen in this area - *Pericallia matronula* – listed in the Polish Red Data Book of Invertebrates. Of historical interest is the early Middle Ages settlement of Gródek, overgrown today with xerothermic vegetation.



Xerothermic grasslands on the slopes of the Bug River valley near Gródek



Plebeius argyrognomon

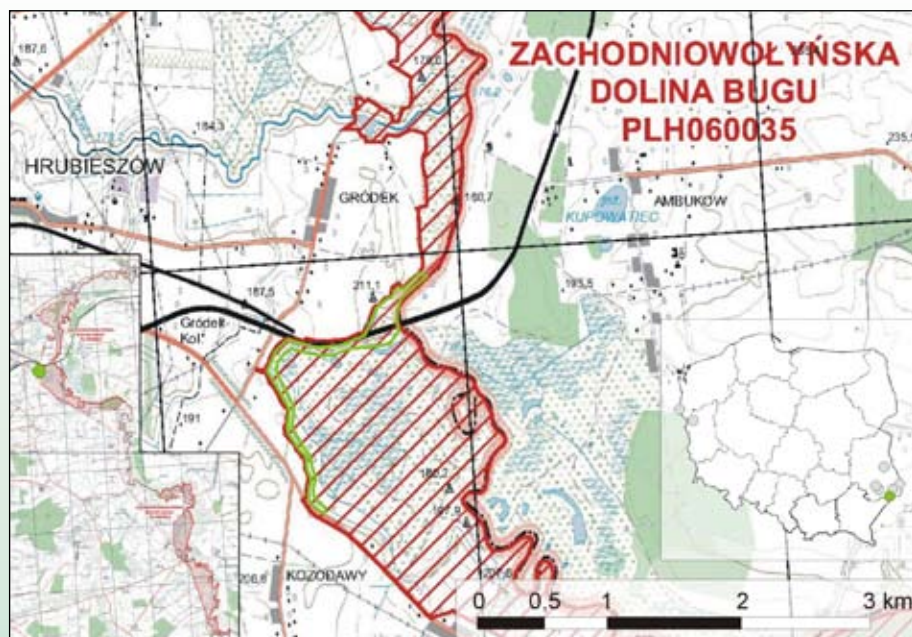


Verbascum phoeniceum



Gypsophila paniculata

The Bug valley slopes were used as pastures just half a century ago. Today they are not used for grazing and the grasslands are occasionally burned. Spillage of herbicides from cultivated fields located at the crests of the slopes related to excessive development and the lack of grazing have resulted in the growth of overly dense ground cover and layers of thatch - also known as “steppe felt”. This makes it difficult or even impossible for seeds of the xerothermic plants growing here to sprout.



The project area of the Zachodniowolyńska Dolina Bugu site (green line on the detailed map)

WHAT DO WE WANT TO DO?

Or, the most important tasks planned for the project



1. Remove or thin the shrubs and trees expansively invading the xerothermic grasslands.
2. Remove non-native, invasive plant species (including *Heracleum sosnowskyi* found in the vicinity of the Żurawce site).
3. Conduct mobile pasturage on part of the xerothermic grasslands.
4. Establish cooperation with local communities to renew grazing on the xerothermic grasslands.
5. Purchase some of the properties with the most valuable fragments of xerothermic grasslands.
6. Prepare scientific documentation and protection plans for selected sites.
7. Organize educational gatherings, conferences, distribute educational materials, produce a film about grasslands, and create a tourism infrastructure at selected sites.
8. Create a Habitat Action Plan for xerothermic grasslands in Poland.
9. Restore the degraded areas of xerothermic grasslands (remove the top layer of soil, sow the seeds of xerothermic species, transplant well preserved fragments of grasslands, etc.).
10. Strengthen the population of *Echium russicum* by planting seedlings grown off-site and sowing seeds of this species.

What will be the results?

1. The state of about 225 ha of xerothermic plant assemblages will be maintained or improved.
2. The biodiversity of eight Natura 2000 sites will be maintained or increased.
3. Shrubs and trees will be removed or thinned out from an area of 77 ha.
4. Nine illegal trash dumps will be removed from xerothermic grassland sites.
5. Eight patches of xerothermic grasslands will be re-cultivated for a total area of about 12 ha.
6. The extensive grazing of animals will be restored on 45 ha of xerothermic grasslands.
7. Scientific documentation and protection plans will be produced for 14 sites to protect xerothermic grasslands.
8. Protection plans will be developed for four Natura 2000 sites and seven reserves or environmental use area.
9. Tourism traffic will be channeled at eight Natura 2000 sites.
10. The population of *Echium russicum* will be increased and stabilized.
11. A professional foundation of knowledge will be established for the further comprehensive protection of xerothermic grasslands in Poland (creation of a Habitat Action Plan for habitat code 6210 xerothermic grasslands).
12. Information and knowledge about the protection of xerothermic grasslands will be propagated in the Lublin, lower Oder River and Warta River regions.



***Orobanche lutea* in the grasslands of Owczary**

HOW CAN GRASSLANDS BE PROTECTED?

As already written above, xerothermic grasslands are an assemblage of semi-natural vegetation, which means that they will not survive on their own, but only in partnership with people. Most of the grassland habitats throughout Europe maintain their open character through extensive use, mostly by grazing, more rarely by mowing, burning and even by sporadic plowing (!). For this reason, simply bringing such habitats under legal protection as reserves or environmental use areas is not enough. Just several decades ago, any human use of grasslands was considered a negative factor in their preservation. It was then that many valuable xerothermic grasslands were “closed” by making them into reserves and any type of use previously made of them – grazing, mowing, burning – was banned. This initiated the process of secondary succession, which quickly led to the transformation of formerly open grassland assemblages into thermophilous scrub and forests. The result is a drastic decrease in the number of xerothermic species – the reason for creating the reserve in the first place. Paradoxically, reserves protecting fragments of thermophilous vegetation are some of the most threatened sites of these rare habitats.

Fortunately, today we are informed by the negative experiences of our predecessors and we have greater knowledge about the establishment and maintenance of xerothermic grasslands. We know that their preservation depends on specific management methods.

The foundation is good grazing!

The main management method of xerothermic grasslands related to extensive herding practices is grazing. The practice of putting out mixed herds of sheep, goats and single individuals of cattle and horses to pasture was frequently used. Generally, the oldest and most primitive breeds of livestock (wrzosówka sheep - a breed derived from *ovis brachyra borealis*, świniarka sheep, konik polski - Polish primitive horse, various goat breeds) are most suitable on such extreme habitats with their poor food base.



Sheep are not the only livestock that can be used to graze xerothermic grasslands

The selective grazing of sheep, which choose the more delicate plants and avoid those with a xeromorphic structure, regulates the species' composition of xerothermic grasslands – eliminating invasive meadow and ruderal species while leaving the xerothermic ones. Domestic animals limit the spread of shrubs and trees naturally. They leave the thicker and older vegetation, and by grazing the open surface of the grasslands, promote the creation of a dynamic mosaic, which leads to a greater diversity of xerothermic habitats. The great heterogeneity of these habitats leads in turn to greater biodiversity. Additionally, domestic animals trample the ground while grazing, destroying in places layers of dead vegetation that negatively impact the development of xerothermic species. The trampling action bares patches of soil, which enables sunlight to reach lower levels of the surface so that light-demanding grassland seedlings can develop and the soil's seed bank can be activated.

It is important to remember that grazing has a positive impact on grasslands only when it is extensive. Too large a herd on too small an area can lead to the destruction of valuable xerothermic plants. In Poland, to be considered extensive, the optimal number of sheep on grasslands has been worked out to be about five individuals per hectare.

The benefits of this method are many. They are connected not only to restoring the natural wealth, but also to cultural and esthetic values. Traditions related to herding are a highly valued but forgotten element of the agricultural landscape in many regions of Poland.

It is best to work together with the local community ...

The biggest problem in restoring grazing to grasslands is society's lack of interest, including farmers, for whom this type of activity has long been unprofitable. There is some hope in agricultural and environmental subsidies for farmers who utilize valuable natural habitats in an extensive manner and raise traditional breeds of livestock. Also, projects to protect xerothermic grasslands, such as ours, are a good opportunity to begin working together with the local community, without whose help efforts to protect many semi-natural habitats would fail. A significant proportion of xerothermic grasslands in Poland are privately owned, and encouraging owners to return to extensive farming practices on this type of land is the best guarantee for their appropriate and long term protection. Recently, a return to traditional farming methods, raising primitive animal breeds, producing local goods and living in harmony with the surrounding environment are becoming more valued. Greater interest is emerging for agrotourism, regional products and foods free of pesticides, antibiotics and the ever-present "chemicals".



Perhaps they should be purchased?

A last resort is the purchase of land whose owners who are not interested in returning to a previous form of use, even with external assistance. This land can then be donated to a park, environmental organization or other private individuals interested in maintaining it in a manner that protects this valuable habitat.

First you have to cut!

Because many xerothermic sites, including some of those incorporated into this planned project, are severely degraded – mainly due to advanced natural succession or afforestation, and also often do not have the appropriate conditions for grazing, it is necessary to remove the shrubs and encroaching trees. Despite appearances, planning the clearing of land is not a simple task. Due to the breeding season of birds, the best time to remove nuisance plants is winter. However, on the other hand, many of the species encroaching on the grasslands, such as blackthorn (*Prunus spinosa*), wolfberry (*Lycium barbarum*), raspberry (*Rubus idaeus*), blackberry (*Rubus fruticosus*) and black locust (*Robinia pseudoacacia*) are highly invasive and clearing them only in winter will not suffice. They will undoubtedly rebound in the spring with renewed strength from the rhizomes and seeds left behind that will be even better able to sprout



Removal of black locust *Robinia pseudoacacia*



Species-rich thermophilous vegetation

given the increased exposure to light in the newly cleared area. In such cases, it is better to remove unwanted vegetation when it is flowering and fruiting. This is when plants are directing most of their energy to flower and fruit production, and to a greater extent succumb to physical damage (including cutting) than at other times during the growing season. But spring and summer are also the seasons when xerothermic grasslands come alive, and could be damaged during clearing activities. A controversial but effective method of removing invasive species is the application of chemical agents to confined areas, commonly used in horticulture for weed control. But an overly hasty application of this solution may be harmful to grassland plants. One of the safest methods is to apply chemical agents to cuts made in the trunks of invasive species during their growing phase or, for example, applying herbicides to freshly cut tree stumps.

It should be remembered, however, that shrub and forest assemblages, despite their threat to grasslands, can also have a special value to the natural environment. Thermophilous riparian forests on slopes or xero-thermophile oak woods where grasslands have developed also represent rare and vanishing habitat types in Europe. The presence of small woodlots and scrubland, hedgerows and individual trees has great significance in preserving a landscape's high level of biodiversity. The mosaic of grasslands, edges, thermophilous shrubs and clumps of trees are far more attractive to many thermophilous fauna than a uniform plain of grassland.

A good practice providing lasting effects is to use cutting together with grazing. The animals regularly put out to graze will systematically consume invasive species re-sprouting from roots and thus impede their development.

In many areas, simply removing invasive plants by cutting will not suffice for other reasons. The seeds of xerothermic species are very short-lived. If old blackthorn plants are removed from a former grassland, we can be sorely disappointed if we expect the soil's seed bank of xerothermic plants to naturally regenerate these species on its own. A supply of seeds from an external source, such as a well preserved grassland, will be required for those sites that are extremely isolated (such as those surrounded by forests) and degraded, with a very small number of desired species. An excellent method of transporting seeds, unconsciously used for centuries, is the rotational grazing of several grasslands by a herd of livestock, known as mobile pasturage. Wool is an excellent transporter for the sticky seeds of many grassland species, and quite a few others also travel in the digestive systems of the animals – some have even adapted to this type of dispersion, known as zoochores.

This is why mobile pasturage is needed!

This method is not widespread in Europe. It is used, however, in some of the countries bordering Poland, such as Germany. It will be used for the first time in Poland during the LIFE+ project.

This method is especially required for the extremely isolated xerothermic grassland project sites that are small, often quite far from farms or their owners are not interested in having them be used. This method was honed by the Naturalists' Club in 2008-2009 during another xerothermic grassland preservation project. It consists of transporting or, more rarely, driving herds of several dozen sheep from site to site during the entire growing season (the sheep return to sheds in the sheepfold for winter). Each grazed surface will be enclosed with a fence that is light and easily set up or dismantled, to be transported together with the herd to the next pasture. Part of the fencing and sheds will be left permanently. These will be located and constructed in such a manner as to provide wildlife with access to the grassland when it is not being used by livestock. The herd will be watched day and night by workers employed for the pasture season and volunteers. The livestock will be transported in a truck owned by the Naturalists' Club, and the shepherds will live in a trailer, transported together with the sheep from grassland to grassland. The animals will systematically be provided with potable water.

First, the animals will be put out to graze in the best preserved areas, and then in the more degraded ones – this will facilitate the spread of xerothermic species' seeds. We also plan to have only part of a grassland grazed (a different portion each year) so that the un-grazed plants can develop and put forth seeds without interference. This will also enable small animals less adapted to grazing practices to survive.



Sheep grazing young blackthorn *Prunus spinosa* shrubs

As a last resort, drastic measures must be applied ...

In extreme cases, the only way to save a xerothermic grassland is to regenerate the most degraded patches. Such activities can be very helpful especially along the migration routes of species, where a restored grassland can reinstate or significantly facilitate migration between particular habitat patches. Xerothermic grasslands can be restored by sowing a set of seeds of the same species' assemblage found in less damaged areas or in another well-preserved area. It is important that the seeds originate from a site as close as possible to the one being restored. Another method is to transplant fragments of well-preserved grasslands. A several dozen centimeters long strip of turf with its accompanying rhizosphere is planted in the grassland to be restored. Such transplanted fragments become the source of desired species for the recreated habitat.

Populations of threatened species can be introduced by collecting their seeds, sprouting and growing seedlings in an ex situ setting, where conditions can be better controlled than in a natural setting, and then the young plants can be transplanted to the site from which the seeds were taken.

Education is also important!

Educational activities are often treated less seriously than „strong preservation measures“. Publishing a folder or organizing a workshop does not often provide the immediate results seen after clearing a site, mowing or constructing a lock. But actually, the problem of environmental protection is in large part a problem of the lack of knowledge among owners, land managers, tourists, investors... Environmental education is the key to resolving this problem. A thorough understanding by society of the reasons and benefits of preserving nature will enable the full, professional and long-term protection of the natural environment surrounding us. It is most important, of course, to educate children and youth, because “What is absorbed during youth is remembered by age”.

PROJECT BENEFICIARIES AND SPONSORS



The project's lead partner is the **Naturalists' Club** – a non-governmental organization. The Club is a social association conducting activities to protect nature and educate society about the environment. It was established in 1983, but officially registered in 1989. The Club is mainly active in western Poland with its headquarters in Świebodzin, but many activities and initiatives are conducted throughout the entire country. The Club currently has over 400 members.

The Club's main activities are focused on nature preservation and environmental education. During its existence, the Club has implemented several dozen large projects, mainly to preserve natural habitats, such as: xerothermic grasslands along the Oder, Warta and Noteć Rivers, peat-bogs in Pomerania and forest ecosystems of the Drawska Forest. It also implemented projects to protect rare animal and plant species, including the European pond terrapin *Emys orbicularis* and Smooth snake *Coronella austriaca*. The Club also conducted projects to minimize conflicts between humans and beavers and to preserve old fruit tree varieties (the Field Station in Owczary has a collection of old fruit tree varieties to preserve this stock) and disappearing weed species. The Club currently operates several projects. In addition to the LIFE+ project to protect xerothermic grasslands, these include “The program to protect alkaline fens and associated, threatened plant species”, “Active protection of snails listed in Annex II of the Habitats Directive: Narrow-mouthed *Vertigo angustior* and Desmoulin's *Vertigo moulinsiana* whorl snails”, second stage of the project “Comprehensive protection of the Puszcza Drawska peat bogs”, “Continuation of the protection of xerothermic grasslands in the Oder and Warta River valleys”. The Environmental Protection Workshop functioning as part of the Club maintains an inventory of natural resources, produces project documents and protection plans for reserves, landscape parks and other types of areas. It also provides various types of expert reports and opinions on topics related to nature.

Other environmental protection activities conducted by the Club include the purchase of land and creation of “private” nature reserves. The first such reserve was established in 1994 and includes unique



xerothermic grasslands in the vicinity of Owczary. Currently, the Club owns, leases or uses land with a total area of over 130 ha.

Each year, the Club organizes several dozen educational conferences, workshops as well as national academic sessions on topics related to various aspects of protecting nature. As part of its educational activities, the Club has a permanent exhibit at the Meadow Museum (Muzeum Łąki) in Owczary near Górczyca. This is also where the Club's Field Station was established 12 years ago. Since 2008, a second station was established in Uniemyśl, the Naturalists' Club Sudecka Field Station (www.karczmaniemyśl.pl/). The Club's educational activities also include trips, camps and contests for children and youth, as well as publications, including several dozen books published annually. More information about the Naturalists' Club can be found at www.kp.org.pl.

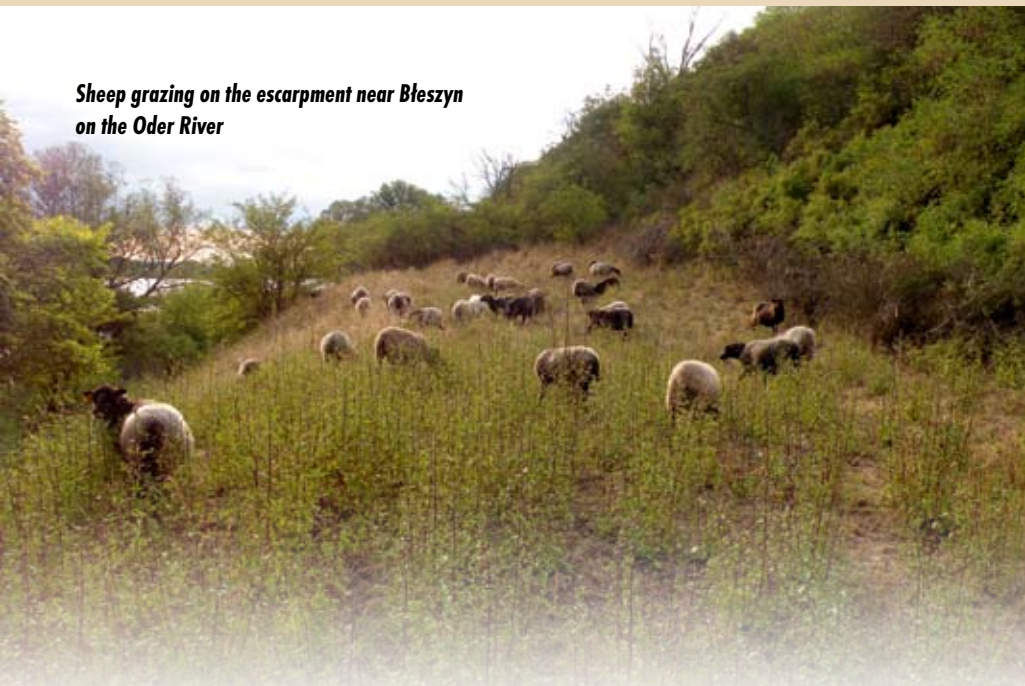


The **Regional Directorate for Environmental Protection in Lublin** is the Naturalists' Club's partner in implementing this project. RDEP in Lublin is an independent office of the central government's administration for the Lublin region, established by the Law of October 3, 2008 on accessing information about the environment and its protection, involvement of society in environmental protection and assessment of the impact of actions on the environment (Journal of Laws No. 199, position 1227). The Directorate implements tasks in the area of nature protection (including the management of Natura 2000 sites), assesses the impact of activities on the environment, undertakes preventive measures to protect the environment, and also implements the eco-management system and EMAS audits. The Directorate works with academic institutions,



Astragalus onobrychis
at the xerothermic grasslands
of the Bug River valley

**Sheep grazing on the escarpment near Bleszyn
on the Oder River**



non-governmental organizations, local government offices and local community residents in the field of nature protection. It implements and participates in nature protection projects, training workshops, conferences, exhibits and other activities related to environmental protection. More information about the Directorate is available at www.lublin.rdos.gov.pl.



50% of the funds for project implementation are provided by the **LIFE+ Nature and Biodiversity Financial Instrument of the European Commission**. LIFE+ is a programme supporting projects that protect nature and the environment in all European Union member states. It is a continuation of LIFE I-III Programmes, which were

established in response to the need to support activities to counteract the negative changes occurring in the natural environment. Since the establishment of LIFE I in 1992, LIFE has financed 3,104 projects in various countries, including 10 in Poland.

The programming cycle of financing of LIFE+ began in 2007 and will continue to 2013. LIFE+ is targeted to all institutions, public as well as private, commercial and non-commercial, registered as legal entities in the European Union.

The Programme has three components that distinguish its three main areas of support:

- LIFE+ Nature and Biodiversity
- LIFE+ Environment Policy and Governance
- LIFE+ Information and Communication

More information about the LIFE+ Financial Instrument can be found at www.ec.europa.eu/environment/life/index.htm.



The next 45% of project costs are financed by the **National Fund for Environmental Protection and Water Management**. Existing since 1990, the NFEPaWM is the most important national government institution responsible for financing environmental protection in the country. From the moment Poland entered the European Union, the main task of the National Fund is the effective and efficient use of EU funds designated for developing and modernizing the infrastructure protecting the environment, as well as to protect nature in our country. This also includes implementing and co-financing LIFE+ projects. NFEPaWM funds are first designated for the implementation of large projects conducted on a trans-regional scale that serve to improve the qualities of water, air and land. Activities in the field of geology and mining, environmental monitoring, prevention of threats to the environment, nature protection and forestry, popularizing knowledge about ecosystems, health prevention among children, as well as academic studies and expert opinions are also financed by the National Fund. Most recently, one of the priority objectives of the NFEPaWM is investing in renewable energy sources.

More information about the NFEPaWM is found at its website www.nfosigw.gov.pl.

The remaining portion of project costs is the beneficiary's share, covered by the project partners - Naturalists' Club and the Regional Directorate for Environmental Protection in Lublin.



The agricultural landscape adjacent to the lower Oder River valley

„Охорона ксеротермічних лук у Польщі – теорія та практика”

На протязі 2010-2013 років на території північно-західної та південно-східної Польщі буде реалізований проект „Охорона ксеротермічних лук у Польщі – теорія та практика”. Головними координаторами проекту є Клуб натуралістів та Регіональна дирекція охорони навколишнього середовища у Любліні. Проект фінансується фондом LIFE+ від Європейського Союзу та Національним фондом охорони навколишнього середовища і водного господарства.

Долини річок Одри і Варти в їхніх нижніх течіях та Любельщизна в широкому розумінні це місце найцінніших та найбільших скупчень ксеротермічних лук в країні. Вісім територій Natura 2000 були обрані для реалізації проекту: нижня Одра, гирло Варти, Ставська Ґура, Недзеліска, Конти, Журавце, Добужек та Західноволінська долина Бугу. В більшості – це території, обрані передусім для охорони ксеротермічної рослинності. У деяких із них, наприклад, Конти, Ставська Ґура, Журавце, Недзеліска, ксеротермічні луки (код екотопу: 6210) займають аж 50-70% поверхні, у тому числі ділянки з орхідеями (пріоритетний екотоп). Окрім цього, на частині названих територій знаходяться термофільні луки (6120*), зарості ялівця звичайного (5130) та вишні степової (40A0*), а також заплавної лісів дубово-в'язово-ясенювих (91F0).

Території, охоплені проектом, є місцем зростання найрідкісніших ксеротермічних видів у Польщі. Серед видів з Додатку II Директиви навколишнього середовища можна назвати: ховрах крапчастий *Spermophilus suslicus*, мишівка степова *Sicista subtilis*, жовтянка рокитникова *Colias myrmidone*, телеїус (синявець родовиковий) *Maculinea teleius*, червінець непарний *Lycaena dispar*, аркас *Maculinea nausithous*, венерині черевички звичайні *Cypripedium calceolus*, синяк червоний *Echium russicum*, одкасник будяколистий *Carlina opopordifolia*. Ці види знаходяться в 6-и із 8-и охоплених проектом територій (Ставська Ґура, Недзеліска, Конти, Журавце, Добужек, Західноволінська Долина Бугу). Окрім цього на всіх територіях знаходяться цінні види рослин, занесені у Червону Книгу рослин Польщі, серед яких ковила прегарна *Stipa pulcherrima*, ковила Іоанна *Stipa joannis*, ковила дніпровська *Stipa borysthena*, віхалка лілійна *Anthericum liliago*, осока лежача *Carex supina*, гадюча цибуля чубкувата *Muscari comosum*, зозулинець пурпуровий *Orchis purpurea*, вишня степова *Cerasus fruticosa*, жовтозілля великолисте *Senecio macrophyllus*, звіробій стрункий *Hypericum elegans*, чемериця чорна *Veratrum nigrum*, а також багато інших рідкісних та зникаючих видів.

Території, залучені до проекту, подібно як більшість ксеротермічних ділянок луку Польщі і Європі, протягом останніх кількох декад потрапили під сильну загрозу перед інтенсифікацією сільського господарства та пов'язані з тим змінами щодо землекористування. Найбільш вразливим для лук є припинення екстенсивного випасання та урухомлена тим самим натуральна зміна, заліснення, розорювання і перетворення лук в поля. Іншими негативними процесами є еутрофізація лук та входження адвентивних видів, пов'язаних з негативними змінами абіотичних умов.

Сьогоднішній проект має на меті затримати та запобігти черговим негативним змінам, які виникають на тлі вище перелічених процесів. Головною метою проекту є комплексна охорона найцінніших ділянок ксеротермічних лук у північно-західній та південно-східній Польщі разом з їх цінною флорою та фауною. Всі заходи спрямовані

на збереження цінної мозаїки теплолюбних екоотопів, важливої для утримання високої біорізноманітності та численних видів рослин і тварин, різноманітних за вимогами місцезростання (серед інших й види околиць лісу і чагарників).

Найважливіші заходи, передбачені у проекті, які служитимуть досягненню вищевказаних цілей:

1. Витинання або проріджування заростей чагарників та дерев
2. Усунення адвентивних видів інвазійних трав'яних рослин (у тому числі борщівка Сосновського на околиці території Журавце)
3. Проведення короткотермінового випасу на частині ксеротермічних лук
4. Налагодження співпраці з місцевим населенням з метою відновлення випасу на цих луках
5. Викуп частини земель, що охоплюють найцінніші фрагменти ксеротермічних лук
6. Приготування природничої документації та планів охорони для обраних об'єктів
7. Організація освітніх зустрічей, конференцій, друк навчально-просвітницьких матеріалів, продукція кінострічок про луки, створення туристичної інфраструктури на обраних об'єктах
8. Створення Плану дій по довкіллю (Habitat Action Plan) для ксеротермічних лук у Польщі
9. Відтворення ксеротермічних лук на zdegradovaniх поверхнях (знімання верхнього шару дернини, висівання ксеротермічних видів, трансплантація добре збережених фрагментів лук тощо)
10. Збагачення популяції сinyaка червоного *Echium russicum* та інших рідкісних видів шляхом досадження вирощеної *ex situ* розсади, висівання насіння цих видів

Передбачені ефекти проекту це:

1. Збереження або покращення стану біля 225 га комплексів ксеротермічної рослинності
2. Збереження або збільшення біорізноманіття на 8 територіях Natura 2000
3. Ліквідація або проріджування заростей чагарників та дерев на площі 77 га
4. Ліквідація 9 диких насипів сміття з території ксеротермічних лук
5. Рекультивация 8 територій ксеротермічних лук загальною площею біля 12 га
6. Відновлення екстенсивного випасання тварин на 45 га ксеротермічних лук
7. Приготування природничої документації та планів охорони для 14 об'єктів ксеротермічних лук
8. Приготування планів охорони для 3 територій Natura 2000 та 7 резерватів або територій екологічного значення
9. Вдосконалення туристичного маршруту на 8 об'єктах Natura 2000
10. Збільшення та стабілізація стану популяції сinyaка червоного *Echium russicum*
11. Створення фахової наукової основи для подальшої комплексної охорони ксеротермічних лук у Польщі
12. Розповсюдження знань на тему охорони ксеротермічних лук в регіоні Любельщизни, нижньої Одри та нижньої Варти

Schutz der Trockenrasen in Polen - Theorie und Praxis

Von 2010 bis 2013 wird im nordwestlichen und südöstlichen Polen ein Projekt „Schutz der Trockenrasen in Polen - Theorie und Praxis“ realisiert werden. Zu den Begünstigten gehören der Klub Przyrodników (Naturschutzklub) und Regionalna Dyrekcja Ochrony Środowiska w Lublinie (Regionale Umweltschutz Direktion in Lublin). Das Projekt wird mit Mitteln von Life+ und Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej (Staatliche Stiftung für Umweltschutz und Wasserwirtschaft) unterstützt.

Das untere Oder- und Warthetal sind zusammen mit der Region um Lublin die wertvollsten und größten Trockenrasengebiete Polens. Für das Projekt wurden acht FFH-Gebiete (Dolna Odra, Ujście Warty, Stawska Góra, Niedzieliska, Kały, Żurawce, Dobużek und Zachodniowolyńska Dolina Bugu) ausgewählt, die hauptsächlich für die Erhaltung der xerothermen Pflanzengesellschaften gegründet wurden.

In einigen Gebieten (u.a. Kały, Stawska Góra, Żurawce, Niedzieliska) umfassen die Lebensräume naturnahe Kalk-Trockenrasen und deren Verbuschungsstadien (Festuco-Brometalia; Code 6210) bis 50-70 % der Fläche, darunter sind besondere Bestände mit bemerkenswerten Orchideen (Prioritär-Lebensraum). Überdies findet man in einem Teil der oben genannten FFH-Gebiete trockene, kalkreiche Sandrasen (6120*), Formationen von *Juniperus communis* auf Kalkheiden und -rasen (5130) und subkontinentale peri-pannonische Gebüsche (40A0*) oder Hartholzauenwälder mit *Quercus robur*, *Ulmus laevis*, *Ulmus minor*, *Fraxinus excelsior* oder *Fraxinus angustifolia* (*Ulmenion minoris*) (91F0).

In diesen Orten wachsen die seltensten xerothermen Pflanzenarten Polens. Neben Arten, die sich auf dem Anhang II der Fauna Flora Habitatrictlinie befinden, kann man hier Tiere wie den Perlziesel *Spermophilus suslicus*, die Steppenbirkenmaus *Sicista subtilis*, den Orangeroten Heufalter *Colias myrmidone*, den Hellen Wiesenknopf-Ameisen-Bläuling *Maculinea teleius*, den Dunklen Wiesenknopf-Ameisenbläuling *Maculinea nausithous*, den Großen Feuerfalter *Lycaena dispar*, und Pflanzen wie den Gelben Frauenschuh *Cypripedium calceolus*, den Roten Natternkopf *Echium russicum* oder *Carlina onopordifolia* finden. Diese gefährdete Arten sind noch in 6 Gebieten des Projekts (Stawska Góra, Niedzieliska, Kały, Żurawce, Dobużek, Zachodniowolyńska Dolina Bugu) anzutreffen.

Zusätzlich wachsen in allen Gebiete seltene Pflanzarten, die im Roten Buch gefährdeter Pflanzenarten eingetragen sind, wie u.a. Gelbscheidiges Federgras *Stipa pulcherrima*, Echtes Federgras *Stipa joannis*, Sand-Federgras *Stipa borysthena*, Astlose Grasllilie *Anthericum liliago*, Steppen-Segge *Carex supina*, Schopfige Traubenhyazinthe *Muscari comosum*, Purpur-Knabenkraut *Orchis purpurea*, Zwerg-Kirsche *Cerasus fruticosa*, *Seneccio macrophyllus*, Zierliche Johanniskraut *Hypericum elegans*, Schwarzer Germer *Veratrum nigrum* und viele andere seltene und geschützte Arten.

Ähnlich wie die Mehrzahl der Trockenrasen in Polen und Europa wurden die Projektgebiete in den letzten Dekaden durch die Intensivierung der Landwirtschaft und dem damit verbundenen Wandel der Nutzung der landwirtschaftlichen Flächen sehr stark gefährdet. Am gefährlichsten für Trockenrasen sind die Einstellung des extensiven Wei-

dens, was Sukzession zur Folge hat, aber auch die Aufforstung und das Pflügen. Andere negative Prozesse sind Eutrophierung und Erscheinen fremder Arten, wodurch sich die abiotischen Bedingungen verändern.

Ziel des Projekts ist das Aufhalten des negativen Wandels in diesen Lebensräumen durch den komplexen Schutz der wertvollsten Trockenrasengebiete mit ihrer ungewöhnlichen Flora und Fauna in nordwestlichen und südöstlichen Polen.

Alle Aktivitäten führen zur Erhaltung möglichst vieler der Trockenhabitats, die wichtig für die Bewahrung der hohen Biodiversität sind und den Schutz der zahlreichen Pflanzen- und Tierarten gewährleisten.

Zu den wichtigsten Aktivitäten im Rahmen des Projekts gehören:

1. Schneiden der Gebüsche und Fällen von Bäumen.
2. Wegräumen der invasiven Pflanzenarten (wie Bärenklau in Umgebung von Żurawka).
3. Teilweise Beweidung der Trockenrasen.
4. Zusammenarbeit mit der lokalen Bevölkerung mit dem Ziel der Wiederherstellung der Beweidung.
5. Ankauf der wertvollsten Grundstücke mit Trockenrasen.
6. Vorbereitung der Gutachten und Managementpläne für ausgewählte Objekte.
7. Durchführungen von Tagungen und Vorträgen, Veröffentlichungen, Produktion eines Filmes über Trockenrasen, Bilden touristischer Infrastruktur in ausgewählten Gebieten.
8. Vorbereitung eines Habitat-Action Planes für Trockenrasen in Polen.
9. Restrukturierung der unfruchtbaren Flächen (Anpflanzung der xerothermischen Pflanzenarten, Transplantation der Grasnarbe usw.).
10. Verstärkung der Populationen von *Echium russicum* und andere Pflanzen mit Aussaat von Samen und Pflänzlingen.

Geplante Ergebnisse des Projekts:

1. Erhaltung oder Verbesserung des Zustands ca. 225 ha Trockenrasen.
2. Erhaltung oder Steigern der Biodiversität in 8 FFH-Gebieten.
3. Schneiden oder Ausdünnen der Gebüsche auf 77 ha.
4. Wegräumen der 9 wilden Müllkippen auf Trockenrasen.
5. Rekultivierung von 8 Flächen Trockenrasen, insgesamt ca. 12 ha.
6. Wiederherstellen der Beweidung von 45 ha Trockenrasen.
7. Vorbereitung von Gutachten und Managementplänen für 14 Objekte.
8. Vorbereitung von Managementplänen für 3 FFH-Gebiete und 7 Naturschutzgebieten oder ökologischen Nutzflächen.
9. Management des Tourismus in 8 FFH-Gebieten.
10. Steigern und Stabilisierung der Populationen von *Echium russicum*.
11. Vorbereitung eines professionellen Leitfadens zum Schutz der Trockenrasen in Polen.
12. Verbreiten des Wissens über Trockenrasenschutz in Gebiet von Lublin, der unteren Oder und Warthe.

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