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4. NATURE VALUE OF THE ENVIRONMENT IN POLAND AND ITS PROTECTION

4.1. Nature value

Poland is characterised by medium diversity in its landscapes. This diversity comprises the following six roughly parallel west-east zones: the coastal belt in the north bordering the Baltic Sea, the lakeland belt, mid-Polish lowlands, uplands in the south and south-east, a lowered foreland basin, and mountains in the extreme south. The most valuable geographical and biological features, unique in Europe, include:

- lowland old-growth forests that retained a wealth of forest habitats reflecting specific topography, along with woodland wetlands, ponds and streams (for example: Białowieża, Knyszyn or Romincka Forests);
- patches of natural forests in the mountain ranges (the Tatra and Beskidy Mountains);
- long natural stretches of medium and large rivers (e.g. Vistula, Bug, Narew, Biebrza, Pasłęka and Radunia) and their valleys

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flooded by snowmelt in spring, with sandbars and oxbow lakes, and remnants of riverine forests;

- vast wetlands: swamps, marshes, bogs and fens (the Biebrza Marshes, Polesie, Tuchola Forest);
- oligotrophic lakes with low levels of nutrients and characteristic assemblages of plant species (e.g. Gacno Wielkie, Głuche, Nierybno, Kapka, Kaleńskie, Bobięcińskie lakes);
- natural flat and cliffed coasts of the Baltic Sea;
- harmonious rural landscapes with a mosaic of arable lands, meadows, pastures and orchards, with grassy, herbaceous and shrubby field margins and boundaries, woodlots and ponds – product of traditional farming activities over several centuries (retained mainly in the south-eastern part) (Symonides 2008).

Poland has relatively rich biological diversity, which is the result of Poland's central geographical position in the European continent, without natural barriers to the east and the west, its transitional climate bearing oceanic as well as continental influences, its geological, geomorphological and hydrological features combined with human intervention over hundreds of years. Living nature in Poland provides representation for a wide range of European species and ecosystems.

It is estimated that the total number of species in Poland is around 63 000, including 2844 species of angiosperms and about 560 species of vertebrates. There are 485 plant assemblages identified (using the Braun-Blanquet method), ca 12% of them being endemic (*Report on...* 2010).

4.2. Nature protection – national measures

Legal protection of natural resources in Poland is provided by legislation protecting individual species and areas. There is a wide range of national designations and they have a vital role in safeguarding Poland's landscapes and biodiversity.

Table 4.1. Objects and areas of special nature value protected by law

Type of protected objects and areas	Number/item	Area	
		in km ²	% of country
National parks	23	3 145.7	1.0
Nature reserves	1 469	1 644.6	0.5
Landscape parks	121	25 296.3	8.1
Landscape protection areas	386	69 925.3	22.4
Monuments of nature	3 6318	–	–
Natural and scenic complexes	324	949.3	0.3
Areas of ecological utility	6 952	516.5	0.2
Documentation sites	157	8.9	0.0

Source: Central Statistical Office (2012).

The Act of 16th April 2004 on Nature Conservation specifies the subject and scope of statutory designations for nature protection in Poland. According to the provisions of the Act, the designations take the form of national parks, nature reserves, landscape parks, landscape protection areas, monuments of nature, natural and scenic complexes, areas of ecological utility, documentation sites (Table 4.1), and the ecological network Natura 2000 sites. Besides, plant, animal and fungi species are legally protected under the Act.

A national park comprises an area with outstanding scientific, natural, social, cultural, and educational qualities, not smaller than 1000 ha, where the environment as a whole is protected, including the landscape. A national park is established to maintain biodiversity, natural resources, abiotic elements of nature and landscapes, to restore natural resources and features, and to reconstruct degraded ecosystems and habitats of plant, animal and fungi species.

At present Poland has 23 national parks but their total area amounts to only 1% of the national area. National parks encompass a wide variety of the best Polish natural environments. There are two national parks at the Baltic Sea coast (Woliński and Słowiński)

and three in the glacial landscapes of lakelands (Drawa, Bory Tucholskie and Wigry). The vast area of lowlands has seven parks protecting forest (Wielkopolski, Kampinos and Białowieża) and wetland ecosystems (Warta River Mouth, Biebrza, Narew, Polesie). In the uplands, three parks (Ojców, Świętokrzyski, Roztocze) preserve varied geological structures and geomorphological features, all with their characteristic vegetation consisting mainly of forests. Due to generally more remote location and lower competition for land use, mountain areas offer greater opportunities for designing protected areas. There are eight national parks in the Polish mountains: two in the Sudetes (Góry Stołowe and Karkonosze) and six in the Carpathians (Tatra, Pieniny, Babia Góra, Gorce, Magura and Bieszczady) (photo 4.1).

The national parks were the subject of a number of monographic and specialised studies, including works co-authored by scientists from the Faculty of Geographical Sciences, Łódź University (Bogdanowicz et al. eds. 2012).



Photo 4.1. Tatra National Park

Source: phot. by M. Klimczewski

A nature reserve is a protected area with natural or close-to-nature ecosystems, refugia, natural habitats, as well as habitats of plant, animal and fungi species, and abiotic elements of nature, having high scientific, natural, cultural, or scenic value. There are nine types of nature reserves: fauna, landscape, forest, peat-bog, flora, water, abiotic nature, steppe and halophyte reserves (Table 4.2). Currently, Poland has 1469 nature reserves (Table 4.1), and nearly half of them (722) are forest reserves (Table 4.2). The largest is Stawy Milickie (the Milicz Ponds) fauna reserve covering 53.24 km² (Centralny Rejestr Obiektów Chronionych).

Table 4.2. Types of nature reserves

Nature reserve types	Number/item	Area (ha)
Fauna	141	42 880
Landscape	108	25 036
Forest	722	66 472
Peat-bog	177	18 213
Flora	169	4 828
Water	44	4 652
Abiotic nature	72	1 817
Steppe	32	514
Halophyte	4	51

Source: Central Statistical Office (2012).

A landscape park is an area protected due to its environmental, historical, and cultural significance. It aims to conserve and popularise the special qualities of the area and promote sustainable territorial development. There are 121 landscape parks in Poland with the total area amounting to 8.1% of the country area.

A landscape protection area is designated to preserve remarkable landscape features, with the aim of protecting diverse ecosystems, valuable especially on account of their significance for

human recreation and tourism, or potential for serving as ecological corridors. Landscape protection areas cover 22.4% of the territory of Poland, which makes them the most popular type of designated areas, however with non-restrictive approach to the protection.

Natural and scenic complexes are designated to protect spectacular fragments of natural and cultural landscapes and to preserve their aesthetic value.

Nature monuments are individual biotic or abiotic features, or their clusters, of outstanding natural, scientific, cultural, historic values, as well as unique landscape characteristics distinguishing them among other objects, especially old and grand trees and bushes of native or alien species, springs, waterfalls, rocks, ravines, erratic boulders, and caves.

Documentation sites are places where geological formations, fossil accumulations or mineral objects, caves and rock shelters together with cave deposits occur, as well as parts of operating or closed opencast and underground mines with significant values for scientific research and education.

Areas of ecological utility comprise the remains of ecosystems significant for biodiversity and meriting their conservation, for example: natural water bodies, field and forest ponds, tree and bush clusters, swamps, peat-bogs, dunes, unused vegetated sites, oxbow lakes, rock outcrops, escarpments, natural habitats, sites with rare or protected species of plants and animals, including places of their seasonal foraging or breeding.

These eight types of nature protected areas and objects cover about 32.5% of the total territory of the country.

Plant, animal and fungi species protection covers species and habitats of plants, animals and fungi. It aims at preservation and maintenance in good conservation status of wild rare, endemic, vulnerable, endangered or protected species of plants, animals and fungi, and also at the protection of genetic and species diversity.

The **Natura 2000** Network is the most recent form of nature conservation in Poland as its implementation began in 2004,

i.e. when Poland acceded to the European Union. The Natura 2000 is designated in all European Union Member States forming an international network at a continent scale that is managed independently at the national level. It aims at stopping biodiversity loss by protecting vulnerable natural habitats, and floral and faunal species that are specific to the European continent.

The Natura 2000 Network is based on two nature conservation directives of the European Union: the Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEC). Under the Birds Directive, Member States are obliged to classify the most suitable sites as Special Protection Areas (SPAs), for the conservation of wild bird species. The Habitats Directive calls for designation of Special Areas for Conservation (SACs) of natural habitat types and animal and plant species they contain. The designation of Natura 2000 sites and areas was based on species and habitats listed in the Annexes of the Habitats and Birds Directives.

The designation of the European Ecological Natura 2000 Network posed a significant governance challenge for nature conservation in Poland. In May 2004 the Polish national government submitted the first proposal of the Natura 2000 Network to the European Commission. The proposal included insufficient number of designated Natura 2000 sites and the European Commission took Poland to the European Union Court of Justice. Following this legal action, the Polish authorities intensified work on the completion of the list of Natura 2000 sites, and hence the Commission decided to close the case in 2009 (Grodzińska-Jurczak et al. 2012).

Currently the Natura 2000 Network in Poland includes 845 Special Areas for Conservation and 145 Special Protection Areas, and covers ca 20% of the country territory (European Environment Agency). Natura 2000 has increased the total area of lands covered by some sort of nature protection in Poland, however in many cases it overlaps with the already existing protected areas (*Protected Areas in Europe...* 2012).

4.3. Nature protection – international designations

Environmental problems often have a transboundary, regional, continental or even global scope, and they can only be dealt with effectively through international co-operation taking form of regional or global multilateral treaties. Poland participates in three global networks of protected areas legally established on the basis of international agreements: the Ramsar Convention, the World Network of Biosphere Reserves, and the World Heritage Convention.

The Ramsar Convention, formally called the Convention on Wetlands of International Importance especially as Waterfowl Habitat, was adopted in Ramsar, Iran, in 1971. The treaty provides the foundations for national activity and international cooperation for the protection and maintenance of ecological features of wetlands. According to the Article 2 of the convention, signatory states are obliged to select wetlands, situated within their territories, as internationally significant in terms of their ecological character and value for waterfowl for the inclusion in the List of Wetlands of International Importance. So far, the Convention has been signed by 168 states, which designated 2168 sites as wetlands of international importance covering over 2 million km² (The Ramsar Convention on Wetlands, www.ramsar.org).

The convention entered into force in Poland in 1978, but already in 1977 Łuknajno Lake Nature Reserve had been selected for the List as the first Polish wetland of international importance. Presently, there are 13 Ramsar sites in Poland (Table 4.3) with the total area of 145 075 ha. Biebrzański National Park, Europe's unique example of diverse wetland ecosystems of a natural lowland river valley, is the largest Ramsar site in Poland (Table 4.3). In 2009, Poland and the Czech Republic agreed to jointly manage the existing two wetlands of international importance extending across the countries' boundary, thereby establishing the transboundary Ramsar site Krkonose/Karkonosze subalpine peatbogs (The Ramsar Convention on Wetlands, www.ramsar.org).

Table 4.3. Wetlands of International Importance in Poland

Ramsar site names	Date of designation	Area (ha)
Biebrzański National Park	27-10-95	59 233
Druzno Lake Nature Reserve	29-10-02	3 068
Karas Lake Nature Reserve	03-01-84	815
Lake of Seven Islands Nature Reserve	03-01-84	1 618
Łuknajno Lake Nature Reserve	22-11-77	1 189
Milicz Fishponds Nature Reserve	27-10-95	5 324
Narew River National Park	29-10-02	7 350
Poleski National Park	29-10-02	9 762
Słowiński National Park	27-10-95	32 744
Subalpine peatbogs in Karkonosze Mountains	29-10-02	40
Świdwie Lake Nature Reserve	03-01-84	891
Warta River Mouth National Park	03-01-84	7 956
Wigry National Park	29-10-02	15 085

Source: The List of Wetlands of International Importance, <http://www.ramsar.org/pdf/sitelist.pdf>

The World Heritage Convention, formally Convention Concerning the Protection of the World Cultural and Natural Heritage, adopted in Paris in 1972, aims to protect and preserve the natural and cultural heritage that is considered to be of outstanding universal value to humanity. According to Article 11 of the Convention, the World Heritage List – a register of most eminent cultural and natural objects was set up. Currently (October 2013), it includes 773 cultural, 198 natural, and 29 mixed properties in 160 countries out of 190 signatory states. The List contains 14 objects from Poland: 13 cultural and only 1 natural object: Białowieża Forest, the last remaining primary deciduous and mixed forest of the European lowlands, home to rich flora and fauna, including European bison (*Bison bonasus*).

To enable spatial analysis, a database containing the objects from the World Heritage List was developed to be employed in GIS (Jaskulski and Szmidt 2012).

The World Network of Biosphere Reserves consists of areas designated under UNESCO's Man and the Biosphere (MAB) Programme, which is an interdisciplinary Intergovernmental Scientific Programme, but not an international convention. The MAB Programme seeks to harmonise the relationship between people and their environment and practically promote sustainable development of communities. It implements and demonstrates its novel approaches using the network of Biosphere Reserves. The reserves have three clearly defined functions: (i) conservation of landscapes, ecosystems and species, (ii) sustainable economic and human development, (iii) research and monitoring along with education related to nature conservation. For this purpose, they consist of three zones: a core zone with legal status ensuring long-term nature protection, and where most human activities are banned; a buffer zone, where only activities compatible with conservation are allowed; and a transitional zone, which does not usually have protected status, and which promotes sustainable development options.

Table 4.4. UNESCO Man and Biosphere Reserves

Biosphere reserves	Designation year	Area in Poland in km ²
Babia Góra	1976 (extension 1997/2001)	118.3
Białowieża	1976 (extension 2005)	105.0
Łuknajno Lake	1976	14.1
Słowiński	1976	207.9
Karkonosze	1992 (transboundary)	55.8
Tatra	1992 (transboundary)	179.1
Eastern Carpathians	1992 (1998 transboundary)	1 138.5
Kampinos Forest	2000	762.3
West Polesie	2002 (2012 transboundary)	1 399.2
Tuchola Forest	2010	3 195.3

Source: UNESCO, Central Statistical Office (2012).

As of 2013, 621 Biosphere Reserves have been designated by 117 countries, including ten sites in Poland (Table 4.4). The youngest and largest reserve in Poland is the Tuchola Forest, which was created in 2010 on 3195.25 km² that cover its core, buffer and transitional zones. The core comprises of Bory Tucholskie National Park and 25 nature reserves, which are the most valuable natural areas in the region. The buffer zone includes 4 landscape parks: Wdzydzki, Zaborski, Tucholski and Wdecki. Transitional zone consists of 22 counties (gmina) and the town of Tuchola. The zone covers over 64% of the whole Biosphere Reserve, which allows its development not to be compromised by more strict protection rules, but at the same time enables using favourable location within the reserve for efficient promotion of the area (Rezerwat Biosfery Bory Tucholskie, <http://www.borytucholskie.org.pl>).

4.4. Natural assets and their protection in the Łódź Voivodship

Natural environment of the Łódź Voivodship is not considered as very attractive in the context of the entire country. However, the location of the voivodship in Central Poland, in the boundary zone between upland and lowland areas provides a considerable diversity of landscape in its southern part. Another important factor influencing the area in question is the presence of big rivers – Pilica and Warta – which in the process of their geological operation led to the formation of large valley forms. The Bzura River, which utilises the vast latitudinally-oriented Warsaw-Berlin Proglacial Valley, also contributes to increased natural attractiveness of the northern part of the voivodship.

High value of natural assets of Central Poland is confirmed by numerous forms of conservation (Table 4.5) established in this area. The most valuable fragments of the Łódź Voivodship are protected as natural reserves. Currently, in the voivodship there are 87 nature reserves (Table 4.6), the majority of which are forest reserves (65) and floristic reserves (10).

Table 4.5. Legal forms of conservation in the Łódź Voivodship

Forms of conservation	Numbers	Area (ha)
National Park (European bison Breeding Station at Smardzewice, a division of Kampinos National Park)	-	68.3
Nature reserves	87	7 440.1
Landscape parks	7	101 920.5
Areas of protected landscape	17	243 264.4
Natura 2000 areas	4 (+1projected)	38 156.4
Special Protection Areas	35	44 335.6*
Special Areas for Conservation		
Monument of nature	3 612**	-
Natural and scenic areas	37	18 638.7*
Areas of ecological utility	834	ca 1650.0
Documentation sites	4	ca 32.0

* Total area, exceeding the borders of the Łódź Voivodship.

** As of December 2010.

Source: <http://lodz.rdos.gov.pl/index.php?option=com>

Table 4.6. Nature reserves by types in the Łódź Voivodship (as of September 2013)

ID.	Types of nature reserves	Numbers	Area (ha)
1.	Faunal reserve	1	2 350.6
2.	Landscape reserves	3	231.2
3.	Forest reserves	65	3 504.2
4.	Peat-bog reserves	6	526.2
5.	Floral reserves	10	299.3
6.	Water reserve	1	487.0
7.	Inanimate nature reserve	1	20.7
	Total	87	7419.2

Source: <http://lodz.rdos.gov.pl/index.php?option=com>

As regards areal forms of conservation, landscape parks play an important part in the system of protected areas (Table 4.7). In the Pilica valley there are as many as three landscape parks: Przedbórz, Sulejów and Spała. Protection covers the sections of the Pilica valley which are most valuable as regards landscape and biology, and which are also the subjects of detailed monographs (Krysiak 1998a, b, 1999, 2004).

Table 4.7. Landscape parks in the Łódź Voivodship

Name	Area in the Łódź Voivodship (ha) (A)	Area of buffer zone (ha) (B)	Total areas with buffer zone (ha) (A+B)	Year of establishment
Bolimów LP	12 185	1 552.4	13 737.7	1986
Łódź Heights LP	11 580	3 083	14 663	1996
Przedbórz LP	9 165	13 048.6	22 213.7	1988
Spała LP	13 110	24134	37 244	1995
Sulejów LP	17 030	36 730	53 760	1994
The Warta and Widawka Interfluve LP	25 330	-	25 330	1989
Załęcze LP	13 520	8 153	21 673	1978

Source: <http://lodz.rdos.gov.pl/index.php?option=com>

Natural environment of the Warta valley is under legal protection too. A particularly interesting section of the valley, encompassing the Działoszyn, Załęcze and Krzeczów gorges and the northernmost fragment of the Polish Jura with calcareous monadnocks and karst formations, was placed under protection in 1978, when Załęcze Landscape Park was established. Areas included in the Załęcze Landscape Park were the subject of research conducted by many employees of the Chair of Physical Geography, including T. Krzemiński (1965, 1974, 1989, 1997), S. Krysiak and E. Papińska (Krysiak and Papińska 2005, Papińska 2001, 2006a, b, 2012, Papińska and Mikita

2001) and also S. Laskowski i W. Tołoczko (Laskowski et al. 2001, Papińska et al. 2001, Papińska and Tołoczko 2002). Also in the Warta valley, the Warta and Widawka Interfluve Landscape Park was created. It is the largest (over 25 thousand ha) landscape park in the Łódź Voivodship. It encompasses not only the Warta valley but also the mouth of the Widawka River. Highly biodiversified ecosystems are represented in the area of this landscape park by various types of habitats from extremely moist (swampy, peaty) to xerothermic ones. Areas included in this landscape park were studied by W. Baliński, G. Bezkowska and A. Majchrowska among others (Bezkowska and Baliński 2001, Bezkowska and Kulesza 2001, Bezkowska et al. 1999, Majchrowska 1999).

The Bolimów Landscape Park was formed in order to protect the exceptionally diverse forest complexes of the Bolimów Forest and a section of the Rawka valley with a naturally meandering channel. Diversified geological structure and relief of the area create a mosaic of habitats, which allow for the occurrence of plant communities ranging from temperate coniferous to oak-hornbeam forests and termophilous oak forests to riparian and alder fen forests. A characteristic feature of the Bolimów Forest are glades which do not occur in other forest complexes of Central Poland. Such a variety of plant landscape types became an impulse for interdisciplinary research which brought about publications by a team of authors E. Papińska, D. Michalska-Hejduk, A. Niewiadomski and W. Tołoczko (2008, 2010).

The youngest landscape park in the Łódź Voivodship is the Łódź Heights Landscape Park, opened in 1996. Its boundaries encompass the northern part of the city of Łódź, which includes one of the biggest forest complexes found within the administrative boundaries of a city – the Łągiwniki Forest. Another reason for the initiative to create a protected area of this class was the unique postglacial relief of this area, which lies in the edge zone of the Łódź Heights. An additional asset of this area are the initial sections of several river valleys and numerous river sources.

Table 4.8. Protected landscape areas of in the Łódź Voivodship

Name of protected landscape areas	Year of establishment	Area (ha)
Bolimowsko-Radziejowicki z doliną środkowej Rawki	1997-07-28	65 650
Brąszewicki	1998-07-31	14 204
Dolina Bzury	1997-07-28	13 500
Dolina Proсны	1996-12-20	14 540
Dolina Przysowy	1988-06-09	2 168
Górnej Rawki	1997-07-28	8 400
Mrogi i Mroźycy	1997-07-28	16 660
Nadwarciański	2009-03-24	29 390
Pradoliny Warszawsko-Berlińskiej	2009-03-24	36 650
Przedborski	2002-07-09	5 417
Puczniewski	1998-07-31	6 276
Środkowej Grabi	1998-07-31	6 558
Dolina Miazgi pod Andrespołem	2006-06-08	142,80
Dolina Wolbórki	2007-08-21	2 272
Doliny Widawki	2007-12-04	41 390
Dolina Chojnatki	2009-03-24	519
Piliczański	2009-03-24	43 790

Source: <http://lodz.rdos.gov.pl/index.php?option=com>

The largest area in the Łódź Voivodship is covered by protected landscape areas (Table 4.8). These areas play an important part in the structure of protected areas and often fulfil the function of ecological passages between areas of higher class of protection. Such form of protection also allows for limiting the expansion of land development into naturally valuable areas.

The youngest form of areal conservation are the Natura 2000 areas (Table 4.9). Within the European Ecological Network Natura 2000, Special Protection Areas are established mostly in large valleys of the Pilica, Warta and Bzura rivers. Protection concerns

species of birds which are important for Europe, in particular those that are on the verge of extinction, as well as regularly occurring species of migratory birds and their habitats. In addition, under the Habitats Directive, 35 Special Areas for Conservation were set up in the Łódź Voivodship.

Table 4.9. Natura 2000 areas in the Łódź Voivodship

Name	Code	Area in the Łódź Voivodship (ha)
1	2	3
Pradolina Warszawsko-Berlińska	PLB 100001	21 968.9
Zbiornik Jeziorsko	PLB 100002	9 570.4
Dolina Przysowy i Studwi (project)	PLB 100003	
Dolina Pilicy	PLB 140003	2 345.5
Dolina Środkowej Warty	PLB 300002	4 271.6
Buczyna Gałkowska	PLH 100016	101.0
Dąbrowa Grotnicka	PLH 100001	101.5
Dąbrowa Świetlista w Pernie	PLH 100002	40.1
Lasy Spalskie	PLH 100003	2016.4
Niebieskie Źródła	PLH 100005	25.2
Pradolina Bzury-Neru	PLH 100006	2 057.3
Załęczański Łuk Warty	PLH 100007	9 317.2
Dolina Środkowej	PLH 100008	3 787.43
Łąka w Bęczkowicach	PLH 100014	191.2
Dolina Rawki	PLH 100015	2 247.59
Buczyna Janinowska	PLH 100017	529.0
Cisy w Jasieniu	PLH 100018	19.7
Dąbrowy świetliste koło Redzenia	PLH 100019	44.3
Lasy Gorzkowickie	PLH 100020	61.5
Grabia	PLH 100021	1 670.5
Grądy nad Lindą	PLH 100022	54.9
Las Dębowiec	PLH 100023	47.0

1	2	3
Lasy Smardzewickie	PLH 100024	286.5
Lipickie Mokradła	PLH 100025	369.5
Lubiaszów w Puszczy Pilickiej	PLH 100026	206
Dąbrowy w Marianku	PLH 100027	72.7
Polany Puszczy Bolimowskiej	PLH 100028	132.3
Słone Łąki w Pełczyskach	PLH 100029	35.0
Torfowiska Żytno – Ewina	PLH 100030	45.3
Wielkopole – Jodły pod Czartorią	PLH 100031	41.9
Silne Błota	PLH 100032	67.4
Szczypiorniak i Kowaliki	PLH 100033	28.5
Wola Cyrusowa	PLH 100034	92.3
Łąki Ciebłowickie	PLH 100035	475.3
Święte Ługi	PLH 100036	151.2
Dolina Dolnej Pilicy	PLH 140016	3 818.6
Grabinka	PLH 140044	10.1
Ostoja Przedborska	PLH 260004	3 597.6
Dolina Czarnej	PLH 260015	1 156.1
Dolina Górnej Pilicy	PLH 260018	2 239.0

Source: <http://lodz.rdos.gov.pl/index.php?option=com>

Apart from areal form of conservation, there are also forms of individual protection in the Łódź Voivodship. The largest group among them are the monuments of nature (Table 4.5, Photos 4.3, 4.4), dominated by living features (trees and avenues of trees). Also numerous in the voivodship are areas of ecological utility (Photo 4.2), although they cover a smaller area than natural and scenic complexes (Table 4.5). Documentation sites are the least numerous, there are only 4 of them in the voivodship and they cover a total area of about 32 ha.



Photo 4.2. Area of ecological utility “Wronia Woda”

Source: phot. by E. Papińska



Photo 4.3. Monument of nature “Góra św. Genowefy”

Source: phot. by E. Papińska



Photo 4.4. Monument of nature “Żabi Staw”

Source: phot. by E. Papińska

Apart from empirical studies of many protected areas in the Łódź Voivodship, theoretical studies were conducted concerning delimitation systems, functioning and importance of protected areas in the natural structure of the environment (Baliński et al. 1999) and also in geographical education (Adamczewska 2008).

There was also a significant body of research on the role of protected areas and environment protection in spatial planning and policy of regional development (Janiszewska et al. 2007a, b, 2008, 2010, Pielesiak 2012).

Abundant scientific experience concerning the protected areas was also used in the creation of a research project entitled *Ecological role of abandoned farmland in the zones surrounding the landscape parks in the Łódź Voivodship*, which was qualified for financing by the National Science Centre (NSC grant – N1760/B/PO1/2011/40). The project includes interdisciplinary landscape and botanical research, whose results will allow to gain better knowledge of processes which occur in the natural environment and to provide better management over protected areas and their surroundings.

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