Robert Wiluś
Institute of Socio-Economical Geography
and Spatial Organization
University of Łódź

The Natural History of Poland

1. Location

Poland is a Central European country that lies at the crossroads of Eastern and Western Europe. Poland shares borders with Lithuania, Belarus and Ukraine to the east; Slovakia and the Czech Republic to the south; Germany to the west, and in the north Poland is bordered by Russia and the Baltic Sea. Poland's surface area of 312.685 sq km ranks eighth in Europe (larger European countries being Russia, Ukraine, France, Germany, Spain, Great Britain and Sweden). Poland is almost an unbroken plain and is roughly circle-like. It measures about 650 km across (both east-west and north-south). Poland is one of nine Baltic Sea States and occupies more than 500 km of the southern Baltic coast. In the south, Poland occupies a strip of the Carpathian and Sudeten Mountains (belonging to the Czech Massif); in the west – the eastern part of the Central European Lowland; and, in the east, the West Russian (or East European) Plain and (North) Ukrainian Upland move in.

2. Topography

Poland is a country with varied topography. It can boast almost all European landscape types – the mountains, uplands, lowlands and seacoast. Yet the average elevation of Poland is 173 m, which is more than 100 m

below the European average. This means that Poland is a markedly flat country. Areas up to 200 m above sea level comprise 75% of the territory, and regions of up to 300 m above sea level – nearly 92%. The uplands, that is areas between 300 and 500 m above sea level make up 5.6% of Poland's territory while the highest elevations constitute a meagre 3.2% (including 0.2% of the altitudes of 1000 m above sea level). The relief reflects the underlying geological structure. Poland lies on the borderline between the two large continental plates – the East-European and West-European ones. The former is Europe's oldest geological unit underlying 1/3 of north-eastern Poland, with a monotonous relief. The West-European plate, on the contrary, is characterised by a wide variety of landforms and is related to Palaeozoic and Alpine belts of folding which created European Massifs. Poland's present relief was largely shaped by last glaciations. Poland was glaciated by four Major Scandinavian ice advances deriving from the north, which accounts for the wealth of glacial features (sands, gravels, clays, loams and erratic boulders) that buried older geological structures. Erosional and depositional action of the glacier created a multitude of convex (moraines, kames and eskers) and concave (grooves and gullies) landforms that account for the variety of scenery in the north of Poland.

Poland's terrain variations run in bands. Poland is divided into six topographic zones running parallel to latitude that correspond to the key natural regions (see: the map "Poland – natural landscape and national parks"). In the north, a narrow coastal lowland region (South-Baltic coastal plains) extends along the Baltic coastline covering around 3% of Poland's territory. The coastline is smooth, and the coast is flat. The coastal plains have largely been shaped by the sea. The action of the sea produced accumulation landforms (e.g. sand bars, dunes and wide sandy beaches) and some erosional coastal features (cliffs here and there). The landscape of the coastal low-lying region is also shaped by the action of the two biggest Polish rivers – the Oder (*Odra*) and Vistula (*Wisła*). Typical deltas are formed at the estuaries of both the rivers. Besides, some depressions in the Vistula delta (*Żuławy*) are 1.5 m below sea level (these are Poland's depression extremes).

The lake region comprises the next belt and makes up 1/3 of Poland's territory. The glacially shaped lakeland is lined with numerous hills and moraine ridges formed by the Scandinavian ice sheet. In their central

part these uplifts reach up to 329 m above sea level (mount *Wieżyca* is the highest elevation in the Central European Lowland). Other remnants of the Scandinavian ice sheet include gullies and grooves filled with water and turned into a complex of more than 9000 lakes. Sediments deposited by glacial meltwater in front of ice snout formed large outwash plains and proglacial stream valleys on the moraine foreland.

To the south of the lake region lies the area of the central (Polish) lowlands. The landscape is characterised by unvaried terrain. The extensive lowland region is lined with several Major rivers, including the Vistula, Oder, *Warta*, *Pilica*, *Narew* and *Bug*, and embellished with their valleys. Some of Europe's highest and largest arcuate dunes have been formed by the wind on sandy accumulation terraces of these river valleys.

The subsequent natural region comprises two ranges of uplands and old mountains. The Sudeten range (with its highest peak *Śnieżka* of 1610 m above sea level) and the *Świętokrzyskie* Mountains (*Łysica* – 611 m) are Poland's oldest and among Europe's older mountain geological structures. These mountain ranges derive from the first orogenic shifts on the European continent, that is the Caledonian and Hercynian periods. The most long-lasting geological processes formed a complex geological structure which, in turn, resulted in a wide variety of landforms. Apart from the mountains, this region encompasses uplands, again, with the highly diversified relief reflecting their varied and complex underlying geological structure. The uplands are formed of carbonate rocks (limestone and chalkstone) and partly of quartz rocks (loess and quartzite). Due to intensive (chemical and mechanical) weathering, the landscape of the uplands is rich in outcrops, caves and gorges. Accumulation of carbonate sediment in the bedrock has fostered the occurrence of karstic forms.

Poland's last topographic belt encompasses the range of the young fold mountains. These are the Carpathians together with their lower elevations in the north: *Pogórze Karpackie* (the Carpathian Foothills) and *Kotliny Przedkarpackie* (the Carpathian Dales). The Tatras are the highest range of the Carpathians, with Poland's highest peak *Rysy* – 2.499 m above sea level. Apart from the Alpine orogeny, the Carpathian relief was shaped by glaciations leaving typical postglacial landforms (U-shaped valleys, kettles, moraines, troughs etc.) that can be observed only in the Tatras.

3. Drainage

Poland has a relatively well-developed and varied river system. As it is located at the Baltic coast, nearly all of Poland (99.77%) is drained into the Baltic Sea. The Vistula is the largest and longest river in Poland (1047 km) and the Vistula catchment area covers more than the half of the country (54%). The Oder, Poland's second largest river, and its tributaries drain 34% of the country's territory. The remaining 12% make up the Baltic basin. Other Poland's principal rivers are the tributaries of the above two, that is the *Bug*, *Narew* and *Pilica* join the Vistula River; and the *Warta* River is Oder's Major tributary.

Lakes are an important element of Poland's water resources. Poland's 9296 lakes occupy the total of 316 927 ha (1% of the country's surface area). The overwhelming Majority of the lakes were formed by glacial action. *Śniardwy* (over 113.8 sq km) and *Mamry* (over 104.4 sq km) are the biggest lakes. Huge terrain undulations (some reach up to 120 m) juxtaposed within a small space account for considerable depths of Polish lakes. *Hańcza*, situated in the north-eastern part of Poland, is the deepest lake (108.5 m in depth). It is also the deepest lake in the Central European Lowland.

Apart from surface waters, underground waters are also found in abundance in Poland. Of different types of underground waters, mineral waters deserve special attention. The latter prevail in mountainous and piedmont areas. Mineral waters occasionally occur in other Poland's topographic zones – the uplands, lowlands, lakeland and coastal plains.

4. Climate

Poland's climatic conditions are influenced by the country's convergent geographical position and latitudinal alignment of natural regions. Climate in Poland is temperate. In general, the weather is determined by two – polar maritime (oceanic) and continental – air masses. Maritime air, gushing from the west, is humid and mild (warm). Continental currents, arriving from the east and north-east, are dry and rough (biting). The climate created by the collision of diverse air masses is transitory. The Arctic air dom-

inates for much of the year. That's why, taken annually, west winds prevail in Poland.

Poland's temperate climate is characterised by great weather variability. As many as six thermal seasons can be distinguished in Poland. The range of mean temperatures is 6 to 8°C, with July being the warmest (17–19°C) and January the coldest (–1°C to –4°C) months. Average annual precipitation for the whole country ranges between 500 and 700 millimetres, rising with increasing altitude. Mountain locations receive as much as 1200–1500 millimetres per year, and the lowlands – as little as 450–600 millimetres. On the average, maximum humidity is reached in July and August (40% of annual precipitation).

5. Vegetation

Originally the territory of Poland was densely wooded. Currently forests cover 28% of Poland' surface area. As a result of ruthless exploitation in the 18th and 19th centuries, the woods were cut down and subsequently replaced with pine monocultures. Poland lies in the Central European zone of mixed forests. The coniferous forest (*bór*) is the predominant type. Mixed forests constitute the next most common type of woodland. Apart from the prevalent pine-tree, Polish forests are also rich in beech-trees, oaks and birches. Spruces and fir-trees are among the most common conifers that grow chiefly in the mountains. The most densely wooded areas in Poland are in the west (*Bory Dolnośląskie, Puszcza Rzepińska, Puszcza Notecka, Puszcza Goleniowska* and *Puszcza Wkrzańska*), north (*Puszcza Piska, Puszcza Augustowska, Puszcza Knyszyńska* and *Puszcza Białowieska*) and south (*Puszcza Karpacka, Puszcza Solska, Puszcza Niepołomicka*).

6. Natural regions

Band-like arrangement of topographic zones is followed by the similar alignment of Poland's natural regions, whose description (from north to south) is given below.

6.1. The Baltic coastal region

This region runs along the coastline as a relatively narrow belt. The landscape of the Baltic coast is characterised by the plains on the ground moraine embellished with a number of terminal moraine ridges that break off at the seashore into steep cliffs of several dozen metres. A notable feature of the coastal region are peatbogs formed in wetland depressions around moraines. The hinterlands of moraine mounds abound in long, wide and steep-sided proglacial valleys. The most interesting fragment of the Baltic coastal region is the shore characterised by wide beaches made of fine and light-toned quartz sand. The beach hinterland is covered with dune ridges overgrown with natural, dry pine forest. Noteworthy are the drifting sand dunes forming Europe's largest accumulation in the centre. To the south, the Baltic coastal region is bordered by the lake region.

6.2. The lake region

The Polish lake region belongs to a larger area of lakelands surrounding the Baltic Sea. The Polish section covers an extensive patch of land between the River Oder in the west and Lithuanian border in the east. The Polish lake region is home to the Pomeranian, Mazurian and *Wielkopolskie* Lakelands. The lakeland region is characterised by postglacial, varied landscape. The landforms include the hills of terminal moraines occasionally reaching over 300 m above sea level. To the south extends an outwash area of more uniform terrain, covered by larger and thicker forest complexes (including *Bory Tucholskie* and primeval forests: *Puszcza Drawska, Puszcza Notecka, Puszcza Piska* and *Puszcza Augustowska*). Postglacial lakes are the prevalent landform in this region. The Pomeranian and Mazurian Lakelands are most generously dotted with lakes. The Mazurian Lakeland encompasses the largest body of water, as its lakes cover about 20% of the area. Poland's largest lakes *Śniardwy* and *Mamry* lie in the central part of the Mazurian Lakeland. This area is also known as 'the land of a thousand lakes'. The lakes are interconnected via rivers and canals, creating a unique system of waterways ideal for water tourism.

6.3. The lowlands (the Land of Great Valleys)

To the south of the lake region lies the lowland belt of great valleys. The following lowlands make up the region from west to east: Silesian Lowland (*Nizina Śląska*), Południowowielkopolska Lowland (*Nizina Południowowielkopolska*), Mazowiecka Lowland (*Nizina Mazowiecka*) and Podlaska Lowland (*Nizina Podlaska*). The relief is rather unvaried. Otherwise flat and monotonous landscape is enlivened by the valleys of Major rivers – the Oder (*Odra*), *Warta, Pilica*, Vistula (*Wisła*), *Narew* and *Bug*. Smooth and wide valley bottoms and dales are covered by marshes and wetlands that are among the largest in Europe (e.g. the *Biebrza* and *Narew* valleys in the north-eastern part of Podlaska Lowland). More elevated areas are enriched with ramparts of sand dunes formed by the wind after the ice sheet retreated. Europe's biggest cluster of inland dunes lies in the Vistula proglacial stream valley, west of Warsaw.

The lowlands are poorly wooded. Forests are amassed in the west (*Bory Dolnośląskie, Puszcza Rzepińska*) and east (*Puszcza Knyszyńska* and *Puszcza Białowieska*). The region takes pride in *Puszcza Białowieska* lying in the north-eastern part of Podlaska Lowland (near the Polish border with Belarus). This most primeval forest in the Central European Lowland has remained the wilderness home to the European Bison, Europe's biggest and oldest mammal. Lowland landscape is rising to a low plateau in the south.

6.4. The Małopolska Uplands

The małopolska Uplands comprise a number of units: Silesian Upland (*Wyżyna Śląska*), Cracow-Częstochowa-Wieluń Upland (*Wyżyna Krakowsko-Częstochowsko-Wieluńska*) also known as Polish Jurassic Rocks (*Jura Polska*) and Kielce-Sandomierz Upland (*Wyżyna Kielecko-Sandomierska*). *Niecka Nidziańska*, located between *Wyżyna Krakowsko-Częstochowska* and *Wyżyna Kielecko-Sandomierska*, also belongs to the małopolska Uplands. The western part of the region (*Wyżyna Śląska* and *Wyżyna Krakowsko-Częstochowsko-Wieluńska*) is characterised by rugged topography. The terrain is brooded over by rocky ledges with smooth surfaces formed by hard mesozoic limestone rocks breaking through to the surface, arranged in multiple

strata, with a north-eastern dip. The ledges reach more than 450 m above sea level, in the central part of *Wyżyna Krakowsko-Częstochowska* – 500 m (*Góra Zamkowa* is 504 m in height). The western Małopolska region has Poland's largest accumulation of karstic landforms. It abounds in clusters of limestone outcrops. The region also prides itself on over 600 caves. The Majority of the caves are inaccessible, being up to 2 km in length. As the bedrock limestone is easily permeable, surface waters are scarce in this region. This part of the małopolska Uplands is covered by deciduous (beech) forests. The topography of *Niecka Nidziańska* is slightly less varied. It is underlain by gypsum rocks that develop karstic phenomena such as characteristic 'dovetail' patterns on the rocky walls. The last unit – *Wyżyna Kielecko-Sandomierska* – has the most diversified geological structure and relief. The Świętokrzyskie Mountains (highest peak *Łysica* – 611 m above sea level) are made of the oldest Pre-Cambrian quartzite rocks. In the postglacial era, water filling the rock cracks blew up quartzite blocks when it froze. In this way rock rubble (also known as treeless area) was formed on steep mountain-sides. The presence of limestone rocks dating back to the Mesozoic period in the area surrounded by old mountains allowed for the formation of karstic landforms that brought about the most picturesque caves in Poland, for example *Jaskinia Raj* (the Cave of Paradise) situated near *Chęciny*. After the ice sheet retreated, huge amounts of fine-grained quartzite particles were deposited by the wind in the eastern part of *Wyżyna Kielecko-Sandomierska*, thus creating considerable loess accumulation near *Sandomierz*. Running surface water carved out numerous and deep gorges in the loess.

Wyżyna Kielecko-Sandomierska is poorly wooded. The only larger forest complex is *Puszcza Świętokrzyska* (Świętokrzyska Primeval Forest) that takes pride in its fir-trees and larches which are becoming extinct across Poland.

6.5. Lubelska Upland and Roztocze

The Lubelska Upland (*Wyżyna Lubelska*) lies to the east of the Małopolska Uplands, between the Vistula and *Bug* valleys. The southernmost part of the Lubelska Upland encompasses elevations reaching up to 390 m above

sea level known as *Roztocze*. The landscape of the Lubelska Upland is made up of average-height rolling hills (up to 320 m above sea level) covered with a thick layer of loess rocks, with numerous and deep gorges sculpted by surface waters. The landscape of *Roztocze* is dominated by flat-bottomed and steep-sided valleys of smaller rivers. A notable feature of the region are small waterfalls popularly known as 'murmurs' (*szumy*). The Lubelska Upland is very scarcely wooded. Loess-based fertile soils created favourable arable conditions. The *Roztocze* area is more generously wooded, chiefly with beech and pine forests.

6.6. The Carpathian Mountains

The Carpathian Mountains occupy Poland's southernmost natural region. Their arcuate range, 330 km in length, extends along the Slovakian border. The Carpathians comprise elevations of over 500 m above sea level and tectonic forelands of up to 400 m in height lying between the ranges of uplands and mountains to the north of the Carpathian bend. The Carpatians are the most picturesque topographic unit in Poland, mainly due to the mountainous relief. The landscape of *Pogórze Karpackie* (the Carpathian foothills) displays the least topographic variety. This region is covered with extensive foothill dales and plateaus dissected with the valleys of principal rivers. As a result of intensive exploitation for farming purposes, this region is poorly wooded. Geologically, Pogórze Karpackie belongs to the outer mountain zone of the Carpatians. The Major part of this area is covered by the Beskid Mountain ranges running parallel to latitude. These mountains are of average height. The heighest elevation is *Babia Góra* (1725 m above sea level) in the western part of the Beskids. The Beskid landscape is characterised by compact massifs and gently sloping mountain ranges with cupola peaks. Steep mountain-sides are lined with numerous valleys of mountain streams and rivers. The Beskid region is divided into the western and eastern parts. From west to east the western Beskid area comprises *Beskid Śląski*, *Beskid Żywiecki, Beskid Makowski, Beskid Mały, Beskid Wyspowy, Gorce, Beskid Sądecki* and *Beskid Niski*. The Polish part of the eastern Beskid area is made up by one *Bieszczady* range. The Beskids are wooded chiefly with spruce forests that have replaced the primeval mixed

fir-and-beech Carpathian Forest. A notable feature of the Beskid region is a multi-layered alignment of vegetation and topographic strata. The most elevated massif of *Babia Góra* alone is home to all the plant layers typical of the highest mountain ranges. In other Beskid ranges the upper vegetation stratum is the subalpine forest treeline. The geological structure of the Carpathian outer zone provides for mineral waters used in health resorts. That's why the Carpathian Mountains are among the key resort areas in Poland. The most popular Carpathian health resorts are situated in the Poprad valley, at the foot of *Beskid Sądecki*.

The smallest yet most picturesque area on the Polish side lies in the inner zone of the Carpathian Mountains. These are the Tatras (the highest Polish mountains) and the *Pieniny*. The Tatras are the only high, alpine mountains in Poland. Given the small area[1] and almost uniform genesis, the landscape of the Polish Tatra Mountains shows exceptional diversity. These mountains are divided into the High Tatras and Western Tatras. The former are rocky mountains, with pointed peaks and steep sides. The Western Tatras are lower and with a gentler slope. The picturesque landscape of the Tatra Mountains was largely shaped by the action of mountain glaciers and postglacial waters. The postglacial landscape of the High Tatra Mountains is dotted with glacial pot-holes that currently nestle postglacial lakes known as '*stawy*' i.e. 'ponds'. Mention should be made of the most well-known kettle of *Czarny Staw* (1579 m above sea level) located under the peak of *Rysy* and the kettle of *Morskie Oko* (1392 m above sea level) nestled below. This multi-layered arrangement of glacial pot-holes and abundance of lakes within such a small area is very untypical of European mountains. Other postglacial landforms dominating the landscape of the Polish Tatra Mountains include U-shaped glacial valleys. Some of the most well-known U-shaped valleys in the Polish Tatras are *Dolina Rybiego Potoku* (Fish-Brook Valley), *Dolina Suchej Wody* (Dry-Water Valley), *Dolina Roztok*i (Glen), *Dolina Pięciu Stawów Pols-*

[1] The Tatra Mountains occupy the total area of 785 square km, with the Polish Tatras occupying nearly 175 sq km and the Slovakian part of the Tatras – about 610 sq km. Thus, less than 1/4 of the Tatra area lies on the Polish territory, and over 3/4 is on the territory of Slovakia.

kich (Valley of Five Polish Ponds) and other. The two most well-known Tatra valleys, *Dolina Chochołowska* and *Dolina Kościeliska*, are located in the Western Tatra Mountains and lack postglacial characteristics. They were formed by the action of running water. Typical of the Western Tatra geological structure are karstic caves which are among the largest and longest in Poland (e.g. the *Mroźna* and *Mylna* caves). The Tatra Mountainous topography has influenced the arrangement of plant and climatic zones, whose characteristic multi-layered alignment is depicted in Fig. 1.

	Natural vegetation cover			Climatic belts	
	Layer of vegetation	Elevation above sea level(in meters)		Bell	Elevation (in meters)
		Limestone	Granite		
2600 2500 2400	Subnival Zone (rocky peaks)		2499	Cold -4 to -2	up to the peaks
2300 2200 2100 2000 1900	Alpine Zone (alpine meadows)	2154	2300	Moderately Cold -2 to 0	2200
1800 1700	Dwarf Pine Belt	1800	1800	Very Cool Temperature 0 to +2	1850
1600 1500 1400 1300 1200 1100 1000	High Mountain Forests	1550	1550 one subalpine range	Cool +2 to < +4	1550
				Moderately Cool +4 to +6	1150
900 800 700	Low Montain Forests	1250			
600 500 400	Piedmont Vegetation Cover	700	700		

Fig. 1.

Natural vegetation cover and climatic belts in the Polish Tatra Mountains

Source: *table compiled by the author, based on the data available in Z. Paryska, W.H. Paryski, 1995, Encyklopedia tatrzańska, Wydawnictwo Górskie, Poronin, p. 912.*

The *Pieniny* are a mountain range in the inner zone of the Carpathian Mountains that occupies a compact mountainous region 10 km in length and 4 km in width. The landscape of the Pieniny Mountains is dominated by narrow ridges with rocky peaks, made of hard Jurassic limestone. Very tall, vertical rocky walls[2] typical of these mountains are a sign of plate tectonics. The Pieniny are divided into two ranges: *Pieniny Właściwe* (the Pieniny Proper) with their highest peak of *Trzy Korony* (982 m above sea level), and *Pieniny Małe* (the Small Pieniny) that are the eastward extension on the range of *Pieniny Właściwe* (mount *Wysoka* – 1015 m above sea level). Although they are lower mountains, *Pieniny Właściwe* have a wider variety of landforms compared to *Pieniny Małe*. The beauty of the Pieniny landscape is accentuated by the contrast between white, bare rocks (often in the form of aiguilles) and the greenery of woods and meadows overgrowing flat areas of elevated land. The rivers flowing in the Pieniny form picturesque ravines. The biggest scenic and tourist attraction in the Pieniny region is the gorge of *Dunajec,* 9 km in length.[3]

6.7. The Sudeten Mountains

The Sudeten are the second largest mountain range in Poland, the Carpathians being the largest. The Sudeten extend along the Czech border in the south of Poland. The *Karkonosze* Mountains (*Śnieżka* – 1602 m above sea level) are the highest mountain massif in the Sudeten. Other mountain ranges (from west to east) are the *Izerskie, Kaczawskie, Rudawy Janowickie, Kamienne, Wałbrzyskie, Sowie, Stołowe, Orlickie, Bystrzyckie, Masyw Śnieżnika, Bialskie, Złote, Bardzkie* and *Opawskie* Mountains. *Przedgórze Sudeckie* (the Sudeten tectonic foreland) is an integral part of the Sudeten. Of all the mountain regions in Poland, the Sudeten have the most complex geological structure. The landscape resembles that of old mountains: smooth ridges and steep mountain-sides pierced with deep valleys are some of its characteristic landforms. Down the streams, along the rocky

[2] For example, the peak of Trzy Korony (Three Crowns) slopes down with a 550 meterhigh wall.

[3] In summer this part of the river, from Sromowce to Szczawnica, turns into the site of trips down the River Dunajec in characteristic wooden boats.

ledges, several-meter-long waterfalls cascade. Cupola peaks of solid rocks hover above the smooth ridges. Similarly to the Carpathian Mountains, the Sudeten vegetation and topographic zones are arranged in strata. Average altitudes of the respective plant layers are about 200 m below those in the Tatra Mountains. The Sudeten scenery is enlivened with hard granite rocky outcrops reaching up to 25 m in height. Some of the most impressive examples are provided by the mountains of *Góry Stołowe* made of horizontal sandstone plates. Here intensive weathering processes sculpted rocky labyrinths and a series of exquisitely shaped outcrops.

Przedgórze Sudeckie (the Sudeten tectonic foreland), extending alongside the Sudeten in the north, is an undulating plain dotted with inselbergs built of very hard rock (mount *Ślęża* – 719 m above sea level).

The Sudeten region is quite densely forested, except for *Przedgórze Sudeckie*. The highest mountain ranges are predominantly covered with spruce monocultures which, like in the case of the Carpathians, replaced the primeval mixed fir-and-beech forests. Upper peatlands are a characteristic feature of the Sudeten.

Complex geological structure and ancient mineralization processes account for the key role of the Sudeten as Poland's site of mineral water resources. These mineral waters are used in treatment in a number of health resorts situated at the foot of these mountains.

7. Environmental protection in Poland – protected areas

High diversity of landforms and relatively unmodified natural environment (compared with Europe as a whole) require protection. Environmental protection in Poland has a long history, dating back to the 11th century, the days of the first Polish rulers. Protected areas were first thought of in the second half of the nineteenths century, when initial steps to found a national park on the territory of the Tatra Mountains (1872) were taken. Actually Poland's first national parks were established in 1930s. The Majority of the existing national parks in Poland were set up after World War II. Apart from national parks, protected areas include scenic parks, nature reserves and areas of protected landscape. Some of Poland's protected areas are placed under the international forms of nature protection listed in

Table 1. Protected areas in Poland occupy nearly 33.1% of country's territory.[4] The total area of the national parks (that offer the most extensive and effective forms of nature protection) amounts to 314 527 ha, which constitutes about 1% of Poland's entire territory. It is noteworthy though that **every topographic zone in Poland is provided with at least one national park**. Thus, most precious areas in the Polish landscape are largely taken care of.

Table 1.
National parks in Poland. Location and basic information

Topographic zones and natural regions	Name of the national park	IUCN categories	Founded in	Total area (ha)
COASTAL LOWLAND REGION				
Baltic Coastal Region (*Pobrzeże Bałtyku*)	Wolinski (BSPA) Slowinski (MaB, R, EE)	II II	1960 1967	10 937 18 618
Lake region				
Pomeranian Lakeland (*Pojezierze Pomorskie*)	Drawienski "Bory Tucholskie"	II –	1990 1996	11 342 4 798
Mazurian Lakeland (*Pojezierze Mazurskie*)	Wigierski	V	1989	15 086
Wielkopolskie Lakeland (*Pojezierze Wielkopolskie*)	"Ujście Warty" (R) Wielkopolski	II	1957	7 584
Central Polish lowlands				
Mazowiecka Lowland (*Nizina Mazowiecka*)	Kampinoski (MaB)	II	1959	38 544
Podlaska Lowland (*Nizina Podlaska*)	Bialowieski (WH, MaB, E,FE) Biebrzanski(R) Narwianski	II – –	1947 (1932)*1993 1996	10 502 59 223 7 350
Poleska Lowland (*Nizina Poleska*)	Poleski (MaB)	II	1990	9 762
Upland and old mountains				
Małopolska Upland (*Wyżyna Małopolska*)	Ojcowski (FE) Świętokrzyski	VII	1956 1950	2 146 7 626
Lubelska Upland (*Wyżyna Lubelska*) and Roztocze	Roztoczański	II	1974	8 483

[4] Source: data of the Central Statistical Office, The Statistical Yearbook 'Nature Protection 2002'.

Sudeten Mountains (*Sudety*)	Karkonoski (MaB) Gór Stołowych	– II	1993 1959	6 339 5 576
Young fold mountains				
Carpathian Mountains (*Karpaty*)	Babiogórski (MaB) Tatrzański (MaB, FE) Gorczański Pieniński Magurski Bieszczadzki (MaB, E)	II – II II II II	1954 1954 1981 1954(1932)* 1995 1973	3 392 21 164 7 030 2 346 19 439 29 202
TOTAL:				**314 527**

The legend:
* – setting up an entity bearing the name of national park
BSPa – Baltic Sea Protected Areas; **E** – European Diploma (Council of Europe); **FE** – member of the EUROPARC Federation; **AB** – biosphere reserves, UNESCO's Man and the Biosphere Programme; **R** – Convention on Wetlands, Ramsar (Convention on Wetlands of International importance, the 'Ramsar List'); **WH** – a world heritage site (UNESCO); **IUCN** – International Union for the Conservation of Nature.

Source: *Author's compilation of the data provided by the Polish Management Board of National Parks.*

The Majority of Polish national parks occupy wooded areas. Forests make up more than half of the park area, in some parks more than 90% (as in e.g. *Białowieski, Babigórski, Roztoczański* and *Gorczański* national parks). Apart from forests, the second largest ecosystem is water (9% of the area protected by national parks). Besides, national parks protect certain landforms including dunes, wetlands, rocks and high mountains. Some of these 23 national parks take pride in exceptional scenic and ecological values. Here mention should be made of the *Słowiński* National Park located in the Baltic coastal region that protects Europe's largest accumulations of drifting sand dunes. In some areas the landscape of the *Słowiński* National Park resembles that of a desert. Another unique protected area is the *Wigierski* National Park based in the lake region. This park gives protection to *Wigry*, a large and one of Poland's most beautiful lakes, as well as several dozen small lakes hidden away in the primeval forests of *Puszcza Augustowska*. The Polish lowlands are home to the unrivalled *Biebrzański* and *Białowieski* National Parks, both located in north-eastern Poland. The former safeguards Europe's best preserved wetlands and peatbogs. The *Białowieski*

Fig. 2. Poland – natural landscape and national parks

National Parks:

1. Woliński
2. Słowiński
3. Wigierski
4. Biebrzański
5. Narwiański
6. Białowieski
7. Borów Tucholskich
8. Drawieński
9. Ujścia Warty
10. Wielkopolski
11. Kampinoski
12. Świętokrzyski
13. Poleski
14. Roztoczański
15. Ojcowski
16. Bieszczadzki
17. Magurski
18. Pieniński
19. Gorczański
20. Tatrzański
21. Babiogórski
22. Gór Stołowych
23. Karkonoski

Geomorphological belts:

I – maritime lowlands
II – lake districts
III – lowlands of central Poland
IV – old mountains and highlands
V — sub-Carpathian depressions
VI – Carpathian Mountains

National Park protects Europe's last lowland primeval forest. What more, it is the wilderness home to the European bison, the biggest and oldest mammal in Europe. This is the only place in Europe where these bisons live in freedom in their natural habitat. Another unexcelled park is the Tatra National Park that protects the highest mountain range in the entire Carpathian Mountains, Poland's only alpine range. Besides, protection covers the unique multilayered vegetation structure (Fig. 2).

Polish national parks, valued for their natural environment, are extremely popular with tourists. Various forms of tourism thrive here, educational and eco-tourism being of utmost importance. National parks located in regions with a beautiful natural landscape, notably in the mountains and at the seaside, attract more tourists. The total influx of tourists in all Poland's national parks in 2001 amounted to over 10 mln.[5] The Tatra National Park, with its 2.5 mln tourists, was an undisputed leader. Second come the *Karkonosze* National Park protecting *Karkonosze,* the highest mountain range in the Sudeten, and the *Woliński* National Park located on the island of *Wolin.* Each of these two parks was visited by 1.5 mln tourists. National parks located in the vicinity of larger.

Polish cities also attract a lot of visitors. These are the *Kampinoski* National Park to the west of Warsaw (1 mln tourists) and the *Wielkopolski* National Park near *Poznań* (1.5 mln tourists).

In the foreseeable future new national parks are going to be set up: in the Mazurian Lakeland (the Mazurian National Park), in *Jura Polska* (the *Jurajski* National Park) and in the foothill area (the *Turnicki* National Park).

Translated by Natalia Mamul

[5] Source: data of the Central Statistical Office, The Statistical Yearbook 'Nature Protection 2002'.