

8. *Mapa hydrograficzna w skali 1: 50 000, ark. 530.2 Kędzierzyn-Koźle, 530.4 Racibórz, Gliwice 531.1*, 1988, GUGiK, Warszawa, OPGK, Poznań.
9. *Mapa sozologiczna Polski w skali 1: 50 000, ark. M- 34-62-A Gliwice*, 1995a, Główny Geodeta Kraju, GEOPOL, Poznań.
10. *Mapa sozologiczna Polski w skali 1: 50 000, ark. M- 34-62-C Rybnik*, 1995a, Główny Geodeta Kraju, GEOPOL, Poznań.
11. Żmuda S., 1973: *Antropogeniczne przeobrażenia środowiska przyrodniczego konurbacji górnośląskiej*, PWN, Warszawa-Kraków.

Edyta Banicka, Grzegorz Hrymak
 Faculty of Earth Science, University of Silesia, Sosnowiec,
 Poland

УДК 556.55 (438)

Anthropogenic Water Reservoirs and their protection in the Upper-Silesian region

Introduction

The region of Upper Silesia (Górny Śląsk) is situated in the south of Poland and covers Silesian Upland (Wyżyna Śląska) and parts of Racibórz and Oświęcim Basins (Kotlina Raciborska and Kotlina Oświęcimska) (Kondracki, 1998). An extreme concentration of water reservoirs, almost entirely of anthropogenic origin, makes it comparable to areas of the highest agglomeration of lakes, i.e. lake districts. Density of lake distribution in Pomeranian Lake District (Pojezierze Pomorskie), for example, is 0.83 statistical lake per square kilometre (Choiński, 1996), while it is as much as 1.13 statistical lake per km² in Upper-Silesian Industrial Region (Górnośląski Okręg Przemysłowy) (GOP) – the economically best-developed part of the province (Rzętała, 1998). The reservoirs resemble lakes characteristic for late-glacial areas, what differentiates them from the latter, however is their great variability of occurrence in place and time. (Jankowski, 1995; Rzętała,

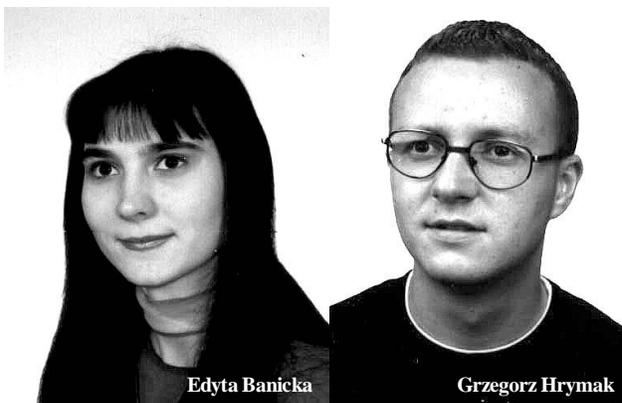
1998). It might seem that such a concentration of ‘lakes’ results in big environmental differentiation of the region and possibilities of rest and recreation for the inhabitants of the agglomeration. Actually, it is quite contrary. Water concentrating in collapse ponds is usually highly contaminated by a number of chemical substances coming from industrial wastes, municipal sewage, groundwater flows or dry and wet precipitation of atmospheric contamination (Kosterski, 1974). Nevertheless, there are some man-made reservoirs of high landscape or environmental quality in the Upper-Silesian (Górny Śląsk) region. While valorising only Dąbrowa Górnicza, Celiński et al. (1996) listed over 50 species of protected plants (there are 47 in Białowieża National Park (Białowieżski Park Narodowy)), many of which grow in water-marsh, water-land and water environment. Some of these reservoirs are protected by law, many of them are subject to recultivation, others have special qualities but are endangered by man. The aim of this paper is to present a unique character as well as a need to protect some of the anthropogenic water reservoirs.

Genesis of water reservoirs

In 1993, there were 1482 water reservoirs in the GOP area; their total area was 1659.9 ha and capacity 35.58 million m³. Small reservoirs of areas less than 1 ha each prevailed among them (81.2% of total number). They constituted 19.5% of total area of the reservoirs and held 9.7% of water retained in that region (Rzętała, 1998). Number of those reservoirs changes constantly, which results from their different origins and destinations.

A. T. Jankowski carried out a genesis-based classification of the reservoirs in 1986. He differentiated four types of them. First type is dam reservoirs (I), which were used for economic purposes in mills, sawmills and fishponds – they are now deteriorating to the large extend or being liquidated. Another type (II) is reservoirs in excavations which were created as a result of sand exploitation. Reservoirs in depressions and collapse synclines (III) result from ore exploitations and post-exploitation underground hollows that are created. In that case the surface of the area is deformed as the ground caves in and sinks. This process currently covers as much as 15.3% of the area of the former Katowice Province (województwo katowickie) (Dwucet, Krajewski, Wach; 1992).

Excavations that have been created in that way are filled with water coming from underground flows or near-surface waters. The remaining reservoirs (IV), which are related to man’s intentional activities and involved in production cycle of industrial plants, are classified as



Edyta Banicka

Grzegorz Hrymak

artificial reservoirs; they include: sewage purification plants, fire-ponds and settling tanks for pit, washing, industrial, filling or chilling waters.

Methods of protection of anthropogenic reservoirs

The aims of protecting anthropogenic reservoirs include maintaining ecological processes and stability of ecosystems, preserving variability of species, securing constant existence of species and ecosystems and restitution of natural resources and elements. These aims are executed in Poland through:

1. creating national parks (with an area of at least 1,000 ha, excluding human interference);
2. giving the status of a natural monument reservation to specified regions: strict (no human interference) or partial;
3. creating landscape parks (with restrictions regarding business activities);
4. marking areas of protected landscapes (which protects various types of ecosystems, e.g. lake-meadow);
5. reinforcement of species protection of plants and animals;
6. reinforcement of individual protection as a result of giving a place or an object a status of: monument of nature, record-piling post, ecological ground or nature-landscape complex.

There are no national parks in the region of Upper Silesia (Górny Śląsk), as it lacks natural ecosystems of that big area. However, there are two landscape parks there; one of them, which came into existence in 1993 and is called 'Cistercian Landscape Architecture of Rudy Wielkie' („Cysterskie Kompozycje Krajobrazowe Rud Wielkich”), covers the area between the valleys of two longest Polish rivers: Oder (Odra) and Vistula (Wisła) and a number of artificial reservoirs, including the ponds: Babicki, Brzeźniak, Grabowiec, Ligotniak, Salm, Zalew Rybnicki. Out of 13 sanctuaries existing in the Upper-Silesian region, one – „Łęczczok” protects anthropogenic reservoirs. The most frequent form of protecting them is establishing ecological grounds on the areas that are useless from the economical point of view, but are extremely important for preserving unique genetic conglomerates and different types of environment. These can be even very small water objects of anthropogenic origin. Other forms of protection (nature-landscape complex, monument of nature, record-piling post) are rather impracticable as far as water reservoirs are concerned.

Examples of water reservoir protection

The best example of water reservoir protection is a forest-pond sanctuary „Łęczczok” situated in the valley of the River Oder (Odra) near Racibórz. The whole sanctuary covers the area of 408.88 ha, of which an area of as much as 245 ha is covered by ponds established in old riverbeds by the Cistercians. Within the ponds, agglomerations of water and waterside flora developed: rushes, bulrushes and clusters of high sedges (Rostański, 1997). The area was registered as a monument of nature as early as 1922 and has been covered by the sanctuary protection scheme since 1957. The flora of the sanctuary comprises over 400 species, out of which 30 species are protected. The species that should be mentioned are *Nuphar luteum*, *Numphaea alba*, *N. Candida*, *Galanthus nivalis*, *Scilla bifolia*, *Lilium martagon*, *Colchicum autumnale*, *Aldrovanda vesiculosa*, *Arum maculatum*, *Daphne mezereum*, *Trapa natans* – a plant included into a group of species in danger of extinction in Poland, *Salvinia natans*, *Straphylea pinnata*. The sanctuary is reckoned among Polish and European refugia for wading birds and those living in wooded areas (over 190 species). *Anser anser*, *Netta rufina* and *Coconia nigra* nest there, *Phalacrocorax carbo* is a species occurring in great number, and birds of prey like *Milvus migrans*, *Accipiter nisus*, *Haliaeetus albicilla* or *Pandion haliaetus* have been observed. Ancient oaks and beeches growing along roads and dikes are worth paying special attention to. Ecological grounds can provide many examples of protection of reservoirs. These include: „Paprocany” in Tychy, „Hałcnowiec” and „Sokoły” with the night heron’ station in Czechowice Dziedzice, fishponds in Tysiąclecia Section in Katowice, a pond Grinfeld in Muchowiec (1st class of water purity), reservoirs in the former sandpits Pogoria I and II in Dąbrowa Górnicza (a refugium for wading birds and a spawning-ground) or ”Żabie Doły” in Bytom (62 species of birds).

An ecological ground ”Paprocany” is a water reservoir surrounded by a forest terrain which total area is 18.5 ha. It was created in 18th century as a result of damming up the river Gostynka by the ironworks that does not exist now. The lake underwent the recultivation in 1986 – silts were removed from the bottom, banks were secured and sowed with grass – and the flora, which is pretty rich now, is a refugium for wading birds (Lewin, 1992). Flora and fauna of that ecological ground is very rich and various. More than 300 species of vascular plants have been observed, including 10 protected ones. One can find: *Hedera helix*, *Nuphar luteum*, *Nymphaea alba*, *Viburnum opulus*, *Convallaria majalis*, *Epipactis helleborine*, *Blechnum spicant* there. Protected animals that occur there are 10 species of insects, 6 species of amphibians, 2 species of reptiles, 32 species of birds and 7

species of mammals. An example of a nature-landscape complex is also „Wielikąt” spreading over the area of 637 ha in the Lubomia parish (Rostański, 1997). It was established to protect a fishpond complex and local fishing business, preserving stations of rare species of birds at the same time.

Conclusions

Being heavily degraded, the region of GOP is becoming an interesting object of research works. Flora and fauna have been catalogued in different points of the region since 1980s. It enabled to discover areas that are new from the natural point of view; they are often recultivated and submitted to the protection scheme. These are natural-landscape complexes like: pond complex Szopienice – Borki in Katowice, valley of the River Brynica with ponds, old riverbeds and park areas in Czeladź, water reservoir in Kozłowa Góra with a park in Świerklaniec, inter-forest meadows, river and ponds in Pniowiec and Strzybnica near Tarnowskie Góry. It should be emphasised that some of protected water reservoirs lose their qualities and are removed from the register of protected areas. For example, this is what happened to a sanctuary of water fauna in Paruszowiec near Rybnik, where, after the pond had been silted up and then purified, the protected species – *Trapa natans* – died out. This example demonstrates the great dynamism of changes within the reservoirs and their durability which is often quite short. Thus, it is very important to keep on monitoring the reservoirs in order to protect them from losing their unique features.

Literature:

1. Celiński F., Czyłok A., 1996: Paradoxy antropopresji. Przyroda Górnego Śląska. Nr. 3.
2. Choiński A., 1996: Zróżnicowanie występowania oczek na Pojezierzu Pomorskim. [w:] Polska w Europie Bałtyckiej. 45 Zjazd Polskiego Towarzystwa Geograficznego Słupsk – Ustka 18-21 września 1996 roku. Polskie Towarzystwo Geograficzne Oddział w Słupsku, Wyższa Szkoła Pedagogiczna w Słupsku. Słupsk
3. Dwucet K., Krajewski W., Wach J., 1992: Rekultywacja i rewitalizacja środowiska przyrodniczego. UŚ Katowice.
4. Jankowski A.T., 1986: Antropogeniczne zmiany stosunków wodnych na obszarze uprzemysłowionym i urbanizowanym (na przykładzie Rybnickiego Okręgu Węglowego). UŚ Katowice.
5. Jankowski A. T., 1995: Z badań nad antropogenicznymi zbiornikami wodnymi na obszarze Górnośląskim. Wybrane zagadnienia geograficzne. Pamięci geografów Uniwersytetu Śląskiego: Józefa Szaflarskiego i Piotra Modrzejewskiego. WNoZ UŚ, oddział w Katowicach, Sosnowiec.
6. Koterski M., 1974: Jakość wody w niewielkich zbiornikach pochodzenia przemysłowego na terenie GOP-u. Gospodarka Wodna. Nr 10.
7. Lewin I., 1992: Wpływ zabiegów rekultywacyjnych na faunę ślimaków jeziora paprocańskiego. [w:] Kształtowanie środowiska geograficznego i ochrona przyrody na obszarach

uprzemysłowionych i zurbanizowanych. 5. WBiOŚ, WNoZ UŚ. Katowice – Sosnowiec.

8. Molenda T., 1999: Charakterystyka hydrograficzna i hydrochemiczna użytku ekologicznego „Staw Gruenfeld”. [w:] Kształtowanie środowiska geograficznego i ochrona przyrody na obszarach uprzemysłowionych i zurbanizowanych. 29. WBiOŚ, WNoZ UŚ. Katowice – Sosnowiec.
9. Rzętała M., 1998: Zróżnicowanie występowania sztucznych zbiorników wodnych na obszarze Wyżyny Katowickiej. Geographia. Studia et Desirationes. T 22.
10. Słownik geograficzny – krajoznawczy Polski: 1998. PWN Warszawa.
11. Strzelec M., 1992: Fauna ślimaków wodnych projektowanego rezerwatu ornitologicznego „Żabie Doły” w Bytomiu. [w:] Kształtowanie środowiska geograficznego i ochrona przyrody na obszarach uprzemysłowionych i zurbanizowanych. 4 . WBiOŚ, WNoZ UŚ. Katowice – Sosnowiec.
12. Rostański K., (red) 1997: Przyroda województwa katowickiego. Wydawnictwo Kubajak. Kraków.

Izabela Polańska

Faculty of Earth Science, University of Silesia, Sosnowiec, Poland

УДК 630 (438)

Forest Phytocoenosis of Upper Silesian Industrial Region in the Light of Antropopression

Описується екологічний стан лісів горного регіону Сілезії в Польщі. Промисловий розвиток в цьому районі, пов'язаний з видобутком корисних копалин, значно вплинув на фауну лісів, на їх атмосферний і геологічний стан. Автор акцентує увагу на необхідності створення заповідників в цьому регіоні, оскільки саме лісові ресурси є захисними проти забруднення ґрунтів, формують сприятливі кліматичні умови, усувають можливість загибелі багатьох видів рослин і тварин.

Trees create a forest – this is an evident truth for each one of us. How many trees do we need to be able to call them forest but not a group of trees or the stand densities? And what except them create forest? The answer is simply. It must be a stand density significantly high to influence on soil and climate. In forest the mutual interacting between soils, vegetations and air can be observed. In our natural conditions the main feature of forest formation was strong natural expansion territorial and ability to renew its own system in normal succession. For the time being this ability is sometimes called in question (Szujewski, 1995). For ages, forests had been subject to strong exploitation, and their area grew reduced very quickly in Poland. The very first who gave attention to the necessity to keep in other words protect forests was Krzysztof Kluk. In XVII century Stanisław August Poniatowski, the

