



THE HYDROGRAPHIC MAP OF POLAND IN THE SCALE 1:50 000 – STRUCTURE OF CONTENT

Основне завдання Гідрографічної карти Польщі масштабу 1:50 000 – відобразити графічну і текстову інформацію (разом з пояснювальними примітками на зворотній стороні карти) про водне середовище і негативні фактори, які йому загрожують. За цією картою можна визначити місцезонавання поверхневих і місцевих джерел забруднення. Описом середовища ми також можемо висловити гіпотезу, що відбуваються потенційні антропогенні та природні процеси і господарська діяльність, які несуть загрозу поверхневим і підземним водам. Карта дає широкі можливості оцінити актуальний стан багатьох складових водного середовища на певній території, включаючи управління водогосподарською діяльністю, в кількісних і якісних показниках. Карта має пізнавальний і практичний характер. На її основі можна робити аналіз поточного планування і змін водного середовища. Вона може використовуватися в розробленні стратегії регіонального розвитку, а також як план організації рельєфу муніципалітетів, округів і провінцій, та обов'язково при прийнятті рішень стосовно використання асигнувань у водному господарстві і при екологічно небезпечних ситуаціях. Оцінку загроз для навколишнього середовища було здійснено у 8-ми тематичних шарах.

Основная задача Гидрографической карты Польши масштаба 1:50 000 – отразить графическую и текстовую информацию (вместе с пояснительными примечаниями на обратной стороне карты) о водной среде и негативных факторах, которые ему угрожают. По этой карте мы можем определить местоположение поверхностных и местных источников загрязнения. Косвенно мы можем высказать гипотезу, что происходят потенциальные антропогенные и природные процессы и хозяйственная деятельность, несущие угрозу поверхностным и подземным водам. Карта дает много возможностей оценить актуальное состояние многих составляющих водной среды на определенной территории, включая управление водохозяйственной деятельностью, в количественных и качественных показателях. Карта имеет познавательный и практический характер. На ее основе можно делать анализ текущего планирования и изменений водной среды. Она может использоваться в разработке стратегии регионального развития, а также как план организации рельефа муниципалитетов, округов и провинций, и обязательно при принятии решений относительно использования ассигнований в водном хозяйстве и при экологически опасных ситуациях. Оценка угроз для окружающей среды было сделано в 8-ми тематических слоях.

Introduction

The Hydrographic Map of Poland in 1:50 000 scale is issued since 1985. Its main objective is to present spatial information (in graphical and digital form) and text information (in form of the commentary on the map reverse) concerning water environment and its changes followed by the contemporary state of water policy (Jokieli and Maksymiuk, 1994; Jankowski, 2004; Bajkiewicz-Grabowska, 2005; Biernat et al, 2005, 2007, 2010; Krzywnicki, 2005; Kaniecki, 2010).

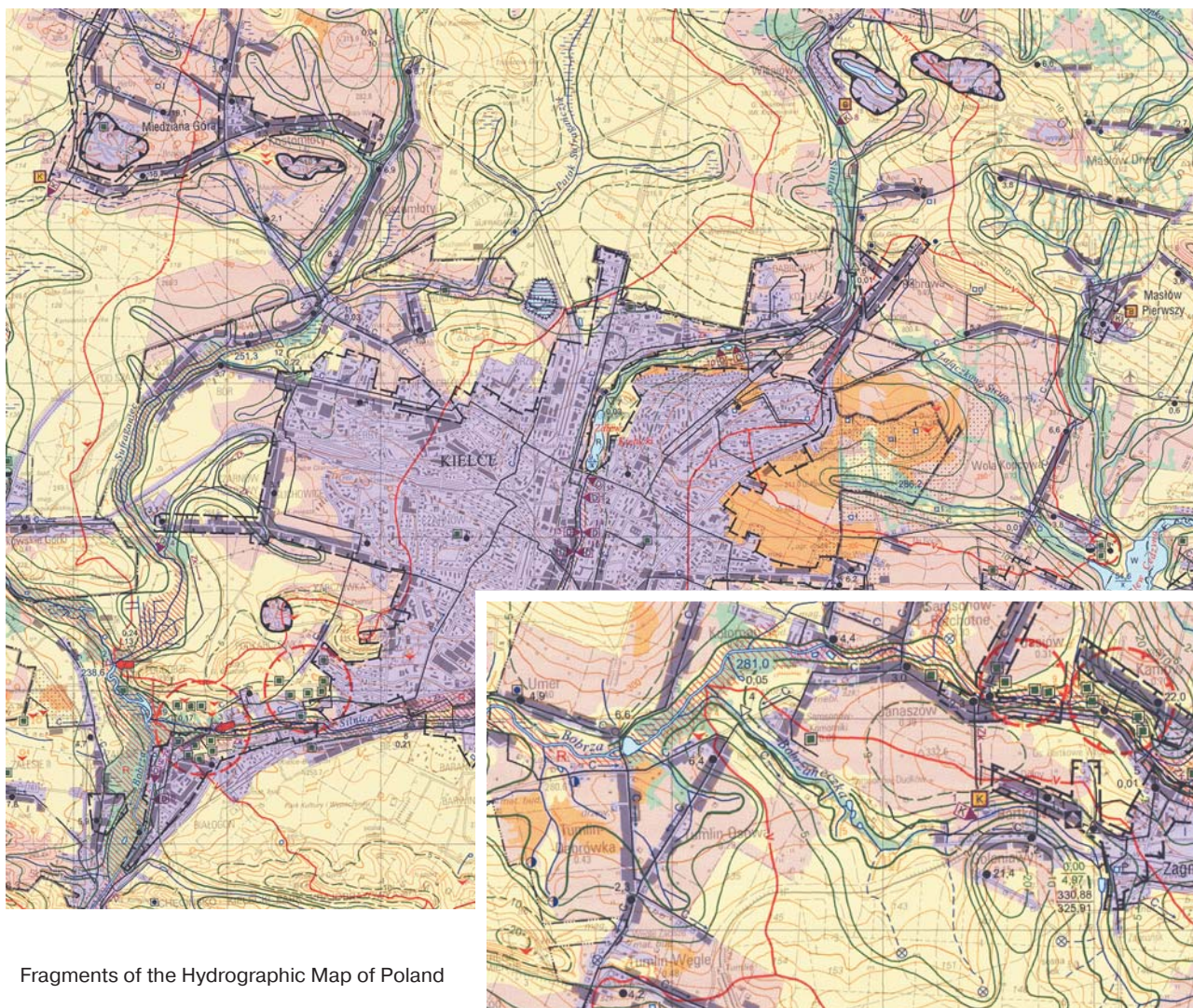
It is a multi-section map designed to cover the whole territory of Poland and it's divided into separate sheets in 1:50 000 scale according to adequate technical instructions (Wytyczne..., 2005). The sheets dimension (525×480 mm – including the map margins) and map division system is identical to the Topographical Map of Poland in 1:50 000 scale (Ostrowski, 1998). The Hydrographical Map of Poland is created in the National Geodetic Coordinate System P UWG 1992 (EPSG: 2180), which is square coordinate system based on the Gauss-Krueger projection on the GRS 80 ellipsoid. The map heading is determined by the map division system in mentioned coordinate system. The basis to determine the individual sheet heading is International Map of the World (WGS 84).

Information concerning map coordinate system is situated on the map margin. Each map section covers approximately 320 km² with latitudinal extent of 15' and longitudinal extent of 10'. The metric plane coordinates are uniform because in the chosen coordinate system one wide 19° central meridian belt is used. In the Hydrographic Map of Poland the vertical heights

reference system refers to the tide gauge in Kronstadt. The map is created accordingly to the special instructions based on available publications, other cartographic materials, statistical data and field analysis (Wytyczne..., 2005) considering progress in digital forms of geographical data presentation and storage.

Currently more than 75 % of country's territory is covered by sections of the described map and this distribution is uneven. Half of the Poland's voivodeships already have all sections prepared for their areas (Dolnośląskie, Lubuskie, Pomorskie, Małopolskie, Śląskie, Świętokrzyskie, Wielkopolskie i Zachodniopomorskie). Solitary sections have been made for Mazowieckie and Podkarpackie Voivodeships and in Podlaskie Voivodeship there are currently no sections prepared (<http://serwis.codgik.gov.pl>). As a reason of the map coverage a significant number of administrative divisions already have access to the Hydrographical Map of Poland and all information which it delivers. The cognitive and banal usage of this map series was an assumption for the Hydrographical Map project. From this point of view information included in this map is used in a variety of planning and investment projects on all administrative levels (for example: spreading of water and sewer networks, locating the flood protection utilities, installation of land-improvement devices etc.). Furthermore the map is used by many institutions dealing with environmental protection issues, spatial planning and other activities connected with water resources.

Meaningful aspect in preparation of spatial-development plans and environmental condition assessments have potential environmental threats, which are often connected with surface and underground aquatic systems. Those threats could have point, line or field character and their temporal and spatial variability is



Fragments of the Hydrographic Map of Poland

conditioned by water cycle in natural and human-changed environment conditions. Those threats are the substantial part of the Hydrographic Map information.

The object of this paper is to present the structure of the Hydrographic Map of Poland in 1:50 000 scale in addition to its thematic layers and text commentary.

Map content

The aquatic environment condition, its threats and protection on the chosen area can be evaluated on the base of eight thematic layers included in the map: topographical drainage divides, surface waters, ground water outflows, ground waters, terrain permeability, water policy objects and effects, points of stationary hydrometric measurements, additional indicators.

Topographical drainage divides. Drainage divides of different order, up to V (fifth). This layer arranges the map contents by establishing natural or anthropogenic borders of surface water circulation, simultaneously pointing out the areas which could be influenced by contaminants spreading in aquatic environment. In urbanized and industrialized areas and also in the bottoms of large rivers valleys, where the land-improvement works were performed the natural course of drainage divides is often disturbed. Drainage divides become uncertain and this leads to changes in

water circulation, especially in periods of higher water levels. In this layer also bifurcation areas and depression sinks (evapotranspirational and retentive of anthropogenic and natural character) are shown.

Surface waters. The condition of surface waters is described accordingly to permanent and periodical rivers (their course and width), natural and artificial water reservoirs with their parameters and functions (in the map scale and exceeding it) and wetlands distribution (permanent and periodical). Those informations allows to analyze potential directions of contaminants spreading in normal and extreme conditions. Significant elements of this thematic layer are areas endangered by floods of the following character: sea floods in high sea level conditions, river floods, surface runoff, floods caused by runoff disturbed by human activity and floods caused by constrained groundwater runoff. This layer also contains locations of ponors and waterfalls (with their heights).

Ground water outflows. This thematic layer represents springs (permanent and periodical, also mineral and of medical usage), their groups and leakages. Those object positions and their parameters (i. e. discharge) are based on field investigations. This allows to make comparison of density and productivity of springs and leakages between different periods of time.



Ground waters. In each section of the Hydrographic Map of Poland there are about 70-100 locations of wells with the information about the distance from ground surface to water level and also height of water level in meters above sea level. On grounds of that six hydroisobathes were delineated (1, 2, 5, 10, 20, 50-60 m) with certain and uncertain course. Also a hypothetical groundwater flow directions are presented. This information is based on field investigations in periods of stable atmospheric conditions.

Terrain permeability. Creation of terrain permeability layer is based on soil-agricultural maps, which are available in various scales in every Polish voivodeship. 6 classes of terrain permeability were distinguished according to the pace of water infiltration and surface runoff on different soil types. The fastest infiltration occurs on rubbles and gravels, moderate – on sands and heavily cracked rocks, weak – on clays and dust, very weak – on solid rocks and loams. Apart of that, variable infiltration have organic soils and – diverse anthropogenic soils, which contribution is significant in urbanized and industrialized areas, also on roads and in rural housing zones. In the areas characterized by variable infiltration rates existence of impermeable surfaces is explicit, with limited infiltration and faster surface runoff concentration.

Water policy objects and effects. This layer is the most diverse thematically. It considers different forms of water environment usage by human. In addition to surface and groundwater we could distinguish objects of point, linear and field geometry. Point objects are: small water reservoirs (of different types that could not be presented in the map scale), and hydrotechnical buildings (i. e. dams, water gates, weirs, valves, anti-debris barriers, barrages, sedimentation tanks, sewages outlets of different kinds). There is also additional information about surface water quality in chosen measuring points. Linear objects are: canals, dykes, floodbanks, covered watercourses, river banks infrastructure, fresh and contaminated water transfers. This information could point out river segments with intensive anthropogenic modifications, where changes in water quantity and quality could occur followed by the changes in river hydrological regimes. Objects of field geometry are: bigger water reservoirs and their functions, drainage areas, flood protected areas, polders, bigger sedimentation tanks, irrigation fields, groundwater contamination areas, groundwater depression funnels, sewerage system areas, areas of artificially changed terrain relief and salt and saline water areas.

Points of stationary hydrometric measurements. Those points are represented by weather stations, observed springs, groundwater measurement stations, gauging and water flow measurement stations. The last concerns small, hydrologically ungauged streams and rivers, where single flow measurements are taken periodically. On the base of this thematic layer it is possible to gain information concerning location of measuring points, water quality and quantity character in aquatic environment and its threats. Additional source of information is in this case map commentary content, enriched with historical data concerning hydrometeorological conditions and groundwater dynamics (Wytyczne, 2005).

Additional indicators. This layer contains geographical names and administrative borders of different levels (communes, cities, counties, voivodeships, countries).

Map commentary

The commentary placed on the back of the Hydrographic Map of Poland in 1:50 000 scale is substantial addendum in the scope of presented informations. It contains 10 chapters.

1) *General characteristic of natural environment.* Contains physiographic, climatic, and administrative position and geographic coordinates of terrain presented in the map section. There is also information about spatial distribution of soil types, land use and nature protection forms.

2) *Geology and terrain relief.* Content of this chapter is valuable addition to the hydrological information on the map. It is based on other thematic maps: geological (covered and uncovered), geoenvironmental, geomorphological and topographical.

3) *Topographical water divides.* This chapter contains detailed description of water divides courses and other hydrographical information about water gates, bifurcation areas, and endorheic basins (which fits into map scale and exceeds it).

4) *Precipitations.* Contents of this chapter are based on information available in other thematic publications and archival materials. It consists of synthetic data concerning average and extreme rainfall amounts registered in pluviometric stations in the area of map section. Significant are both – monthly and annual rainfall characteristics. This chapter also contains information about snow cover – time of its occurrence, duration and thickness.

5) *Surface waters.* This part of the map commentary is a detailed description of surface waters with their names, also taking into account their characteristics. It describes running waters and water reservoirs (natural and artificial) along with their dimensions (area, depth, dam height).

6) *Hydrologic characteristics.* They are based on available published text and numerical data (contemporary and archival) describing running waters – water levels and flow velocity in hydrometric stations located on rivers flowing through the map section. Average and extreme water levels and flow velocities in annual and perennial cycles are analyzed. Results are presented in tables and diagrams.

7) *Groundwaters.* This chapter takes into account location and hydrogeological characteristics of analyzed area, depth of the first usable groundwater level in different kinds of drilled and dug wells (based on existing maps and text documents). Furthermore in this section an interpretation of hydroisobathes course presented on the map is described.

8) *Field investigation characteristics.* Here the mandatory informations about hydrometeorological situation while performing field surveys are presented. It enables to perform further comparative analyses, which are very important from the hydrologic point of view.

9) *Surface water condition.* In this chapter the most important sever outlets are described (their location, parcel owner, type, quantity, clearance devices and flow direction). Furthermore, information about water condition in monitored rivers are used in the chapter text (those presented on the map and information from the literature).

10) *Aquatic systems changes.* Chapter contains description of the anthropogenic influence on aquatic



systems in the selected area, composing an assessment concerning typical changes in rural, industrial and urban areas.

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УКРАЇНСЬКО-РОСІЙСЬКИЙ КОРДОН В ЕТНОПОЛІТИЧНІЙ РЕТРОСПЕКЦІЇ

Путем сравнения этнических и политических карт разных периодов с привлечением метода исторических параллелей выполнен анализ ситуации, сложившейся в украинско-российском пограничье. Рассматриваются различия, выявленные при наложении этнических и политических границ государств и регионов, а также региональные различия в менталитете населения и способы отображения их на картах. На примере изданий ГНПП "Картографія" демонстрируется роль исторических карт как инструмента этнополитических исследований.

Using the comparison of ethnical and political maps of different periods and with the involvement of the method of historical parallels the analysis of situation at Ukrainian-Russian border zone is done. Distinctions that have been revealed during overlapping of ethnical and political boundaries of states and regions are considered as well as regional mental distinctions of population and techniques of their plotting on maps. Using the example of SSPE "Kartographia's" publications the significance of historical maps as a tool of ethnopolitical research is demonstrated.

Кореляція етнічних і політичних кордонів. Уроки європейської історії. Кожна держава прагне зберегти свій кордон у незмінному стані, принаймні в осяжній перспективі. Непорушність кордонів декларується в конституціях, а іноді карбується і в малюнку

ку державних гербів (Білорусь, М'янма, Камерун, Мадагаскар [20]). Та все ж приблизно раз на півстоліття європейські кордони суттєво перекроюються.

Сучасна політична карта Європи, як результат багатьох війн і дипломатичних зусиль, сформувалася в обопільний спосіб: спочатку політичний принцип домінував над етнічним і обрис середньовічних

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