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Hydrographic changes in a river system and their influence on the legal classification of watercourses, exemplified by selected tributaries of the San river

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Abstract. The paper presents hydrographic changes in a river system and their influence on the legal classification of watercourses in Poland. As a case study, the watercourse Motwica, right tributary of the river San has been analysed. The main objective of this paper is an attempt to analyse whether the Motwica should be classified as flowing or standing water and the legal grounds for such classification in the Water Law Act. On the base of archival and contemporary cartographic materials' analysis it has been determined that the Motwica should not be classified as natural watercourse because its significant part flows in an artificial channel.

Key words:
hydrographic changes,
classification of watercources,
the Water Law Act,
Motwica

Introduction

Water resources are the most important component of the geographic environment responsible for the development of civilisation (Kowalczak 2008). Various forms of water resource management exist, depending on the location of the resources. In Poland, the act of law determining the principle of water management is the Water Law Act (Pol. Ustawa Prawo Wodne).

Inland surface waters in Poland, according to art. 5 para. 3 of the Water Law Act of 18 July 2001 (consolidated text in Journal of Laws of 2015, item 469 as amended) are divided into standing and flowing waters. From a legal standpoint this has consequences for, among others, the ownership of waters and water-covered land. The current normative definition of flowing and standing waters in Poland is considered to be imprecise. Kubiak-Wójcicka and Marszelewski (2012) express a similar view, pointing to the fact that from a hydrological perspective this division is artificial and does not reflect reality. This must therefore have consequences in evaluations of individual cases, particularly when a particular body has been subject to intense human activity. River channels have been subjugated to the needs of man, which has led to changes in the hydromorphological system of watercourses, and hence to changes in the water relations throughout the entire catchment. Changes in water relations have for many years been the subject of scientific studies (Dynowska 1993; Kaniecki 2011). Most attention

has been given to changes in lake surfaces (Choiński 1997; Czaja 1997; Marszelewski and Adamczyk, 2004; Choiński and Ptak 2008; Czaja and Jańczak 2010; Kubiak-Wójcicka and Golba 2011; Kubiak-Wójcicka and Lewandowska 2014, 2015) and to the courses of river networks (Florek and Nadoczna 1986; Wład 1998; Grabińska and Szymczyk 2012; Myga-Piętek 2003; Kubiak-Wójcicka and Kordowski 2015; Małecki and Ptak 2015). Despite the extensive literature in this area there is a lack of studies on the influence of changes to water relations on property rights to waters and related consequences.

Based on the Water Law Act of 18 July 2002, art. 1 para. 2 and 3, in the matter of inland surface waters or parts thereof constituting public property (Journal of Laws of 2003, no 16, item 149), on 17 December 2002 the Council of Ministers regulated inventories of inland waters significant to the forming of water resources and protection against inundation, and waters significant to the engineering of water relations for agricultural purposes. These waters were listed in three appendices to that regulation.

It is impossible to ignore that this regulation, despite 13 years having passed since its issuance, has not been updated in any way. Based on studies and expertise, the natural character of the water network may be excluded, resulting in its character as a system of flowing waters failing to be comprehended in the Water Law Act. In this situation, a change in the classification of a water network from flowing to standing water gives rise to specific legal consequences. It opens to civil-law transactions lands throughout this network which are covered by waters and which have been classified as standing water.

It must be highlighted once again that the problem of hydrographic changes relating to waters and land covered by waters is still little represented from the standpoint of property law in the literature. Changes in the classification of watercourses are not carried out in easily accessible regulations and inventories, and the hydrological expertise on whose basis a watercourse's status is changed to standing water has not been published. The cited hydrological analyses conducted by expert witnesses in the field of hydrology are to be found in the records of individual court cases. Therefore, the lack of up-to-date knowledge in the field of watercourse classification may mislead both contemporary and future users of those waters.

Study area

As an example of an area in which numerous changes in individual watercourses have been made in a relatively short period we can cite the catchment of the watercourse currently known as the Motwica, and its neighbouring catchments of the Szkło and the Szkło (old bed) (Pol. Szkło (Stare Koryto)). These are watercourses of the right-bank catchment of the San river. From an administrative standpoint they lie in the Jarosław district of the Podkarpackie voivodeship.

The Motwica watercourse also goes by the name of Mutwica. For the purposes of the current work the authors will use the name Motwica, as that having most universal currency. This watercourse is 14.11 km long and has a catchment of 35.64 km^2 (Table 1). The Motwica issues into the San River at kilometre 127.64 of the San's course (Atlas podziału hydrograficznego Polski 2005). The stream is marked as a surface water body (Pol. jednolita część wód powierzchniowych (JCWP)) with the code PLRW20001722554 and the name "Potok Motwica". It is located in the Vistula basin, in the Upper Vistula water region under the Regional Water Management Authority in Kraków. The combined water body to which the Motwica belongs has the code GW0814. The Motwica's surface water body type is "lowland sandy stream" (17) and has the status of a "natural water body". The condition of the Motwica stream is defined as poor, while the evaluation of risk of not attaining environmental goals is "no risk". There are no water gauge stations along the Motwica – it is an unmonitored watercourse. The average annual discharge of the Motwica calculated from empirical formulae is 0.13 m^{3}s^{-1}.

Immediately neighbouring the Motwica stream in the San catchment are the river Szkło (old bed) and the Szkło (Table 1). The river Szkło (old bed) flows into the San below the mouth of the Motwica, while the Szkło flows in above the mouth of the Motwica. So, the very names Szkło and Szkło (old bed) suggest that the courses of these waters have undergone changes (Fig. 1).

The courses of the Motwica, Szkło and Szkło (old bed) are under the administration of The Podkarpackie Voivodeship Board of Land Amelioration and Water Facilities.

The Motwica has been classified as a public-property flowing surface water body significant to the engineering of water relations for agricultural purposes (Appendix 2 of the Council of Ministers Regulation of 17 December 2002).

The river Szkło has been classified as an inland surface water body, or part thereof, constituting public property significant to the formation of water resources and flood protection (Appendix 1 of the Council of Ministers Regulation of 17 December 2002).

This paper focuses on the Motwica watercourse. Initial field observations show that different stretches of the Motwica have differing channel characteristics: drainage ditch, canal and natural watercourse. The watercourse and its catchment are an area of particular interest both from the perspectives of governmental/local-government control and that of investors. On the one hand, the area is of importance for national administration due to its potential for exploitation in the event of flood threats and, in this, securing the population against inundation. On the other, extraction of minerals (sand and gravel) by private investors also goes on in the Motwica catchment. An expansion of extraction activities is planned for the near future in the area, which is a subject of interest to commercial businesses.

The Motwica is a case study for exploring the legal consequences of hydrographic changes in the light of the provisions of the Water Law Act. Determination of the current nature of the Motwica – whether it is a natural or artificial watercourse, or a water facility as part of a drainage system, requires analysis not only of its course, but also of the source of the waters it bears.

The main objective of this paper is to attempt to analyse whether the Motwica should be classified as flowing or standing water and the legal grounds for such classification in the Water Law Act.

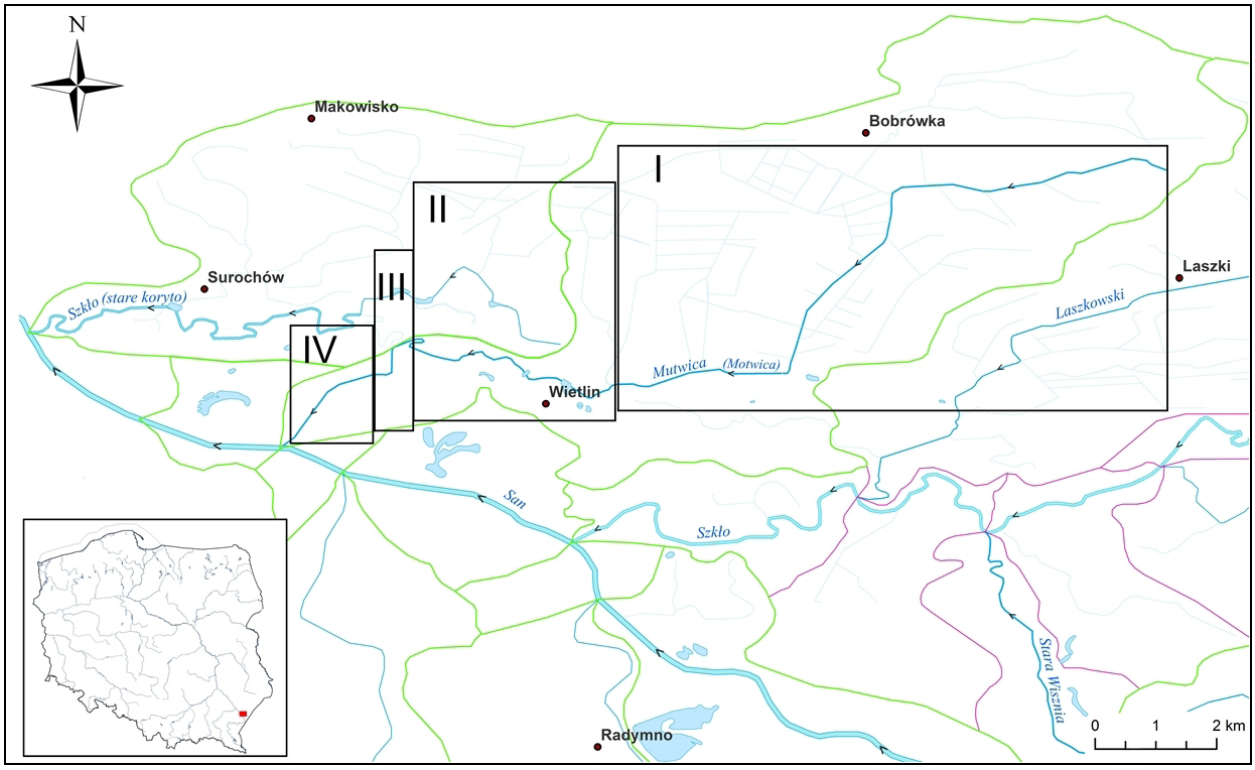

Fig. 1. Fragment of the San river catchment, with catchments of component watercourses – the Szkło (old bed), the Motwica and the Szkło, based on the Raster Map of the Hydrographic Division of Poland (Pol. Rastrowa Mapa Podziału Hydrograficznego Polski)

Map legend: light blue line – category IV tributaries and lower; dark blue line – category III watercourses; green line – category III watershed; red line – category IV watershed. Stretches of the Motwica of various origins: stretch I – drainage ditches; stretch II – river Szkło (old bed); stretch III – canal; stretch IV – San oxbow

Table 1. Features of the analysed watercourses (Atlas podziału hydrograficznego Polski 2005)

Name of watercourse	Kilometre of confluence with parent river	Catchment area km^2	Total length km
Szkło	131.18	826.34 (including 586.68 abroad)	78.03 (38 km in Poland)
Motwica	127.64	35.64	14.11
Szkło (old riverbed)	124.14	18.10	9.98

Research methods and materials

This work uses a cartographic method for studying environmental changes, with particular attention to changes in the natural environment, and the hydrographic environment in particular. Archival and contemporary cartographic materials were used to assess changes in the river system. To this end, cartographic materials in the form of maps from the 19th to 21st century were used. The oldest map used in this paper is an Austrian map from 1824 (Mapa Austriacka z 1824 r.), Königreichen Galizien und Lodomerien, Liesganig. The Austrian cadastral map (Mapa katastralna austriacka z 1851 r.) Gemeinde Laszki of 1851 deserves particular attention. Also used was a 1855 Austrian map (Mapa austriacka z 1855 r.) from the collection: "Administrativ-Karte von den Königreichen Galizien und Lodomerien mit dem Grossherzogthume Krakau und den Herzogthümern Auschwitz, Zator und Bukowina in 60 Blättern", C.R. von Kummersberg, scale 1:115,000, Vienna 1855, sheet: Umgebungen von Jaroslau, Radymno, Krakowiec, Przemyśl und Mościska. Also, a 1878 1:75,000 Austrian map (Mapa austriacka z 1878 r.) (the Jaroslau sheet) presents the condition immediately after the river San was regulated.

These maps represent a valuable source of information on changes in the hydrographic environment. This is because they present conditions before drainage and engineering works were conducted on the river channels and directly after them. The applicability of historical and contemporary cartographic materials to evaluations of transformations of the natural environmental, including water systems, is attested by numerous scientific works (Graf et al. 2008; Kaniecki 2011). However, it is important to bear in mind that historical maps serve for an overview only, due to their cartometric inadequacies (Małecki and Ptak 2015).

This paper also uses contemporary topographic maps from the 1980s, the 1:50,000-scale KZGW raster map of 2007 and the map of flood threats used to determine the scope of changes made in the course of the waters. Besides the analysis of available cartographic sources a review of governmental documentation, regulations and scientific papers directly related to the course of the Motwica was also conducted.

The following is an attempt to present the legal consequences of changes in the right-bank tributaries of the river San in the Jarosław district of the Podkarpackie voivodeship.

Results and discussion

The collected cartographic material shows significant changes in the course of the river system, not only of the Motwica itself, but also of its neighbouring watercourses. Even a cursory analysis of contemporary hydrographic and topographic maps shows that some stretches of the Motwica have a straight-line course, while others meander.

In the upper part of the catchment there is a visible network of drainage ditches perpendicular to the watercourse's channel (stretch I – Fig. 1). These ditches drain the land to the south of the town of Bobrówka. In the town of Wietlin, the Motwica carries water along the former channel of the Szkło river, which is meandering in nature (stretch II – Fig. 1). At the river kilometre 1+900 there is a ditch running southwards at a 90° angle (stretch III). Next, the Motwica takes its waters through the San oxbow (stretch IV – Fig. 1), and then, negotiating a sharp drop in terrain, flows into the San river.

While field observations were being made it was observed that the hydrographic map of stretch III deviates from reality. At kilometre 1+900 of the watercourse, part of the water from the Motwica goes to the aforementioned ditch (stretch III), while the remainder flows along the vacant channel of the Szkło to carry its waters out to the river Szkło (old bed). We are therefore dealing here with a local bifurcation. Water from the Motwica is taken away to the San river at two different locations as the outflow of the Motwica and the outflow of the Szkło (old bed).

The current hydrographic condition of the catchment of the Motwica stream and Szkło and Szkło (old bed) rivers is the result of engineering work conducted during the Austrian partition. This is confirmed by maps and historical sources, which will allow the current status of the watercourse to be determined. The oldest available sources of information include the 1824 map which presents the condition before engineering (Fig. 2). The watercourse called Wisznia Fl. is noteworthy, and in its lower course flows almost parallel to the San river, flowing into it at the town of Jarosław. In the lower course of Wisznia Fl. (around the town of Łazy) the watercourse is fed by the right-bank tributary called Krakowska R., which contains a reservoir. This map does not include a watercourse called Motwica. The place where the Motwica is currently located lies between the towns of Bobrowka, Surohow and Laszki. On the 1824 map, this is wooded swamp land.

On the next map, from 1855, it is possible to see the river called Szkło R., into which an unnamed watercourse feeds near the town of Wietlin (Fig. 3). This watercourse is connected to a system of drainage ditches draining the land to the south of the town of Bobrówka. The watercourse in question is unnamed, and its straight-line nature attests to its anthropogenic nature. Besides this, Szkło R. issues into the San near the town of Sobiecin.

Figure 4 presents the historical and contemporary system of drainage ditches to the south of the town of Bobrówka where, according to the map of hydrographic divisions, the Motwica begins.

Further changes in the hydrographic network of the study area result from engineering work on the San conducted at the end of the 19th century.

The literature includes information that in the 17th century the river San was still navigable (Wład 1998). The river's loss of navigability is attributed to the deforestation of the catchment, which caused a significant fluctuation in the level of the river and an increase in soil erosion, which in turn resulted in a quickening of the silting of the river channel. In the 18th century the San ceased to function as a waterway.

The engineering of the San around 1870 was carried out for the purpose of protecting riverside

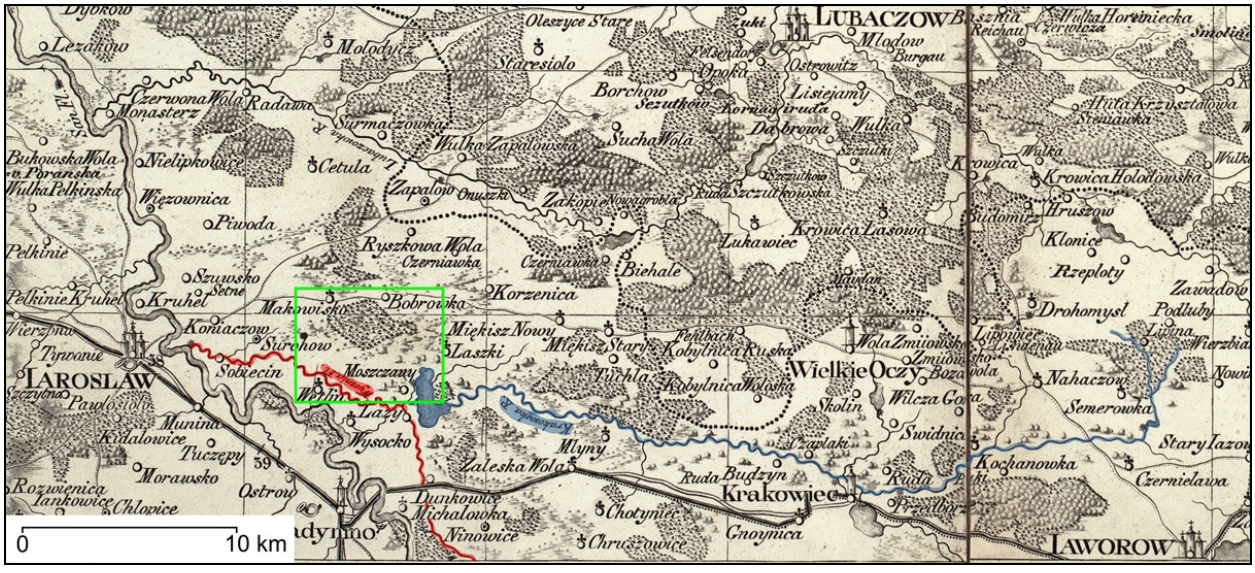

Fig. 2. Fragment of the 1824 Austrian map indicating the area of the current Motwica catchment (green border), the course of the Krakowska river (Krakowska R.) (blue line) and the Wisznia river (Wysznia Fl.) (red line).

farming activities and as an attempt to possibly return the river to navigability. In this way, not only was the river shortened, but its gradient was also increased from 0.22‰ to 0.36‰. As Wład (1998) states, this work coincided with an overall drop in the level of the river's waters. The quickened flow and reduced amount of water caused vertical erosion and an approximately 2-metre lowering of the river surface level around Jarosław and Przemyśl. Therefore, from the perspective of returning the San to navigability, the engineering work was unsuccessful. The lowering of the water level in the river reduced water retention around the river channel and resulted in a significant lowering of water levels in the territory adjacent to the river. There was consequently a quick and total drying up of the San oxbow, including the oxbow to which the ditch was dug, later referred to as the Motwica. The way in which the channel of the San was straightened around Jarosław is depicted in the 1878 Austrian map (Fig. 5).

The lowering of the water level in the San river which resulted from the engineering of its channel, and above all from the digging away of its meanders, explains the atypical mouth of the Motwica watercourse into the San. This watercourse did not shape its own valley, which, in the effluent stretch would have issued into the river San in a gradual manner; rather, in its final few tens of metres it falls sharply down a stony bed to the San. The lack of erosional features in the section by the mouth of the Motwica and the clear difference in bed levels between the Motwica and the San confirm the thesis that, on the one hand the water level in the San dropped significantly due to the engineering work, and on the other that the Motwica did not form the typical features of the mouth of a confluence due to part of the waters from the Szkło's catchment having been conducted via a canal to the San.

It must be assessed whether the drainage works conducted to the south of the village of Bobrówka, which involved the felling of the riparian forest shown in that location on the 1824 map (Fig. 2) and the creation of a drainage ditch as shown on the 1855 map (Fig. 3) – and which is in use to this day – meet the criteria for classification as works resulting in specific water drainage facilities, as understood in the Water Law Act. If so, this means that the area where the Motwica "stream" begins (area I – Fig. 1) constitutes a water facility. The truth of this proposition would be proven by confirmation that the waters borne in the channel of the Motwica originate from the area of drained fields lying to the north of what is today the village of Wietlin Pierwszy and to the south of the village of Bobrówka, which lands were drained between 1824 and 1855 (Figs 2 and 3). The proposition is already supported by the fact

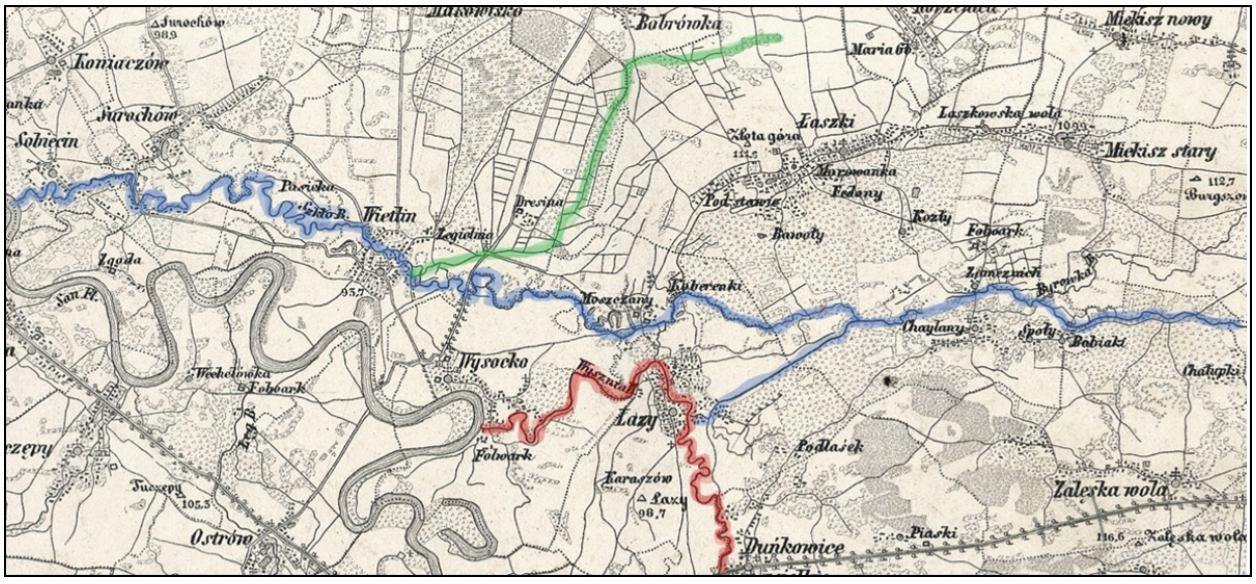

Fig. 3. Fragment of the 1855 Austrian map indicating the new, extended course of the river Szkło R. (blue line), the shortened course of the river Wisznia (red line) and the system of drainage ditches – today's Motwica (green line)

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that these waters were conducted away by engineering works to the channel of the river Szkło, which at that time underwent significant hydromorphological changes – it was, above all, connected to the network of the Krakowska and Wisznia rivers, with the former being renamed entirely as the "Szkło" and the Wisznia being shortened and conducted to the San river above the mouth of the Szkło.

Figure 6 shows a bend of the river San – deprived of water after the river engineering works of circa 1870 which straightened the channel. A comparison of stretches II and IV of the Motwica is presented in Figure 7. A fragment of the 1855 Austrian map can be seen to show the bend of the San river before engineering and the lack of a canal between the channel of the Szkło and the San.

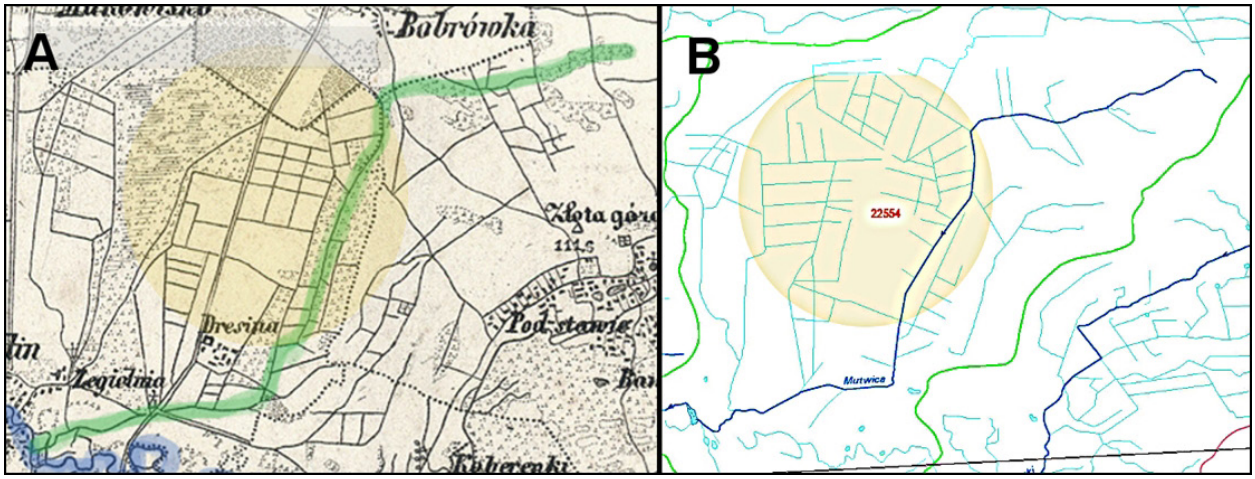

Fig. 4. Fragment of the 1855 Austrian map (A) and the contemporary hydrographic raster map (B) – stretch I of the Motwica stream (drainage ditches)

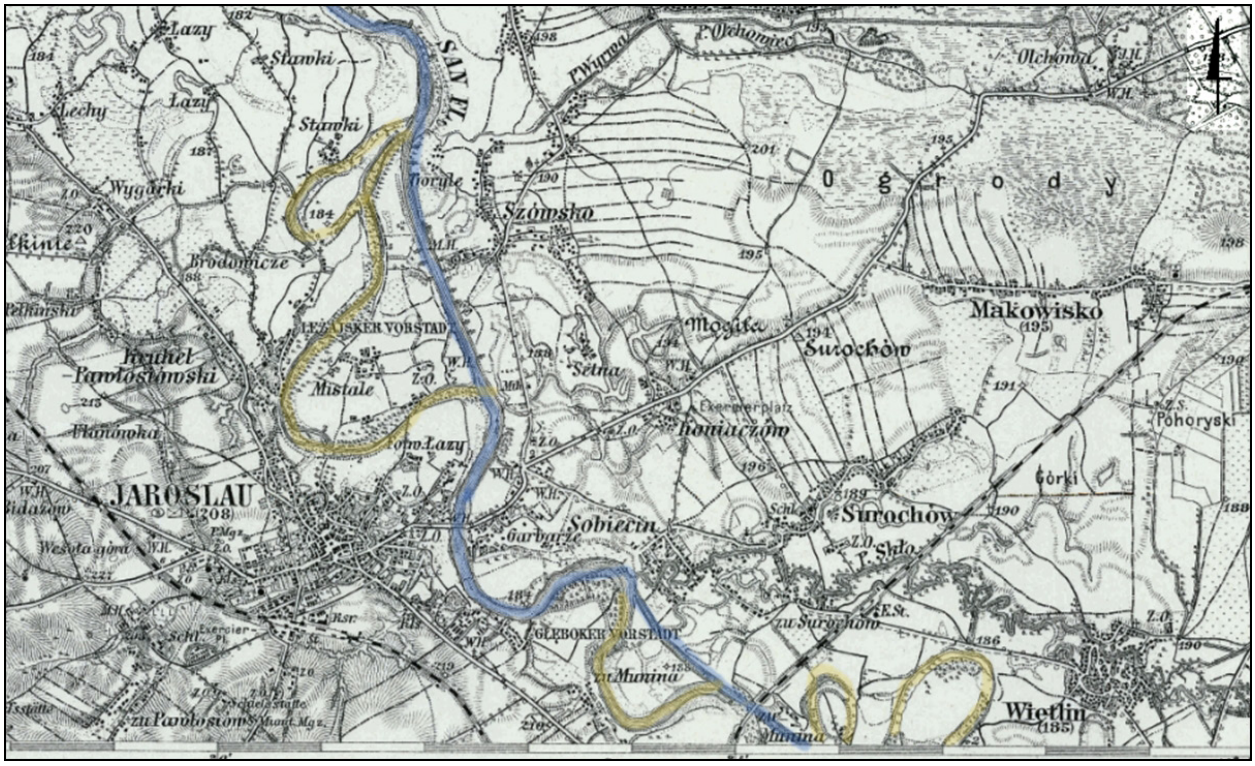

Fig. 5. Fragment of the rescaled 1878 Austrian map indicating the course of the San after engineering: blue line – new channel; yellow lnie – old channel

It is therefore difficult to speak of a natural watercourse when it does not flow from springs but, rather, takes its origins from ameliorated farming lands, which for the stretch from km 6+000 to km 1+900 (4,100 metres) takes the old channel of the Wisznia/Szkło river, while for the stretch from 1+900 to km 0+850 (1,050 metres) it runs as a straight ditch (Fig. 7 juxtaposing a fragment of the 1855 Austrian map with the contemporary raster map), and for 850 m then runs through a ditch and the San oxbow (stretch III) to its mouth with the San. Thus, of the entire 15.6-km length of the watercourse, the last 1,900 metres take an artificial ditch, 4,100 metres are the channel of another watercourse (Wisznia/Szkło), and the remaining 9,400 metres is accounted for by a network of drainage ditches between the villages of Bobrówka and Wietlin Pierwszy.

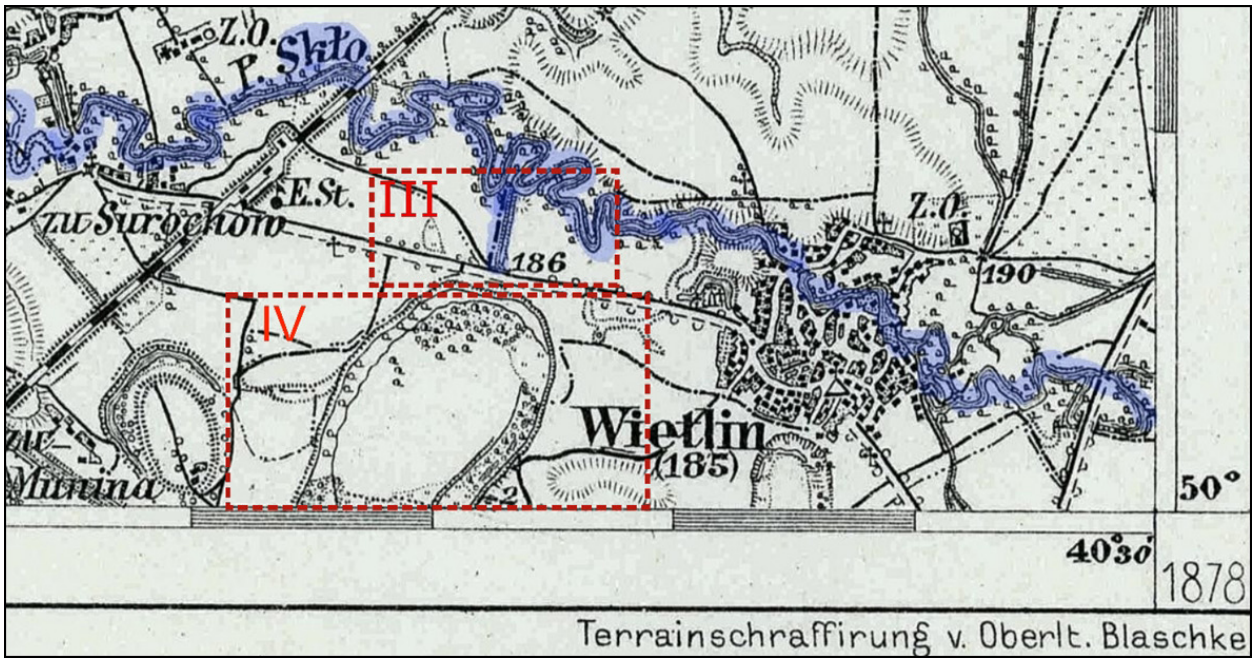

Fig. 6. Fragment of the 1878 Austrian map, showing the course of the Szkło channel in blue; the canal currently being used as part of the Motwica channel (stretch III) is already visible, as is the San oxbow left over from its engineering, and currently being used as part of the Motwica channel (stretch IV)

Fig. 7. Fragment of the 1855 Austrian map (A) and the 1980 raster map (B) showing the retained course of the river Szkło (old bed) and the canal leading to the San oxbow, currently the channel of the Motwica – stretches III and IV of the Motwica

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In the situation being described (stretches III and IV) we are not dealing with a natural watercourse flowing through a regulated channel as understood by the Water Law Act, because it is hard to point to a stretch of the course of the Motwica's channel which could be described as natural. Art. 9, para. 1, pt 1 of the Water Law Act indicates that natural watercourses are considered to be rivers and streams and other waters flowing constantly or periodically along natural or regulated channels. Conducting engineering of a watercourse does not change its designation as a natural watercourse (Osuch-Chacińska, 2008).

From a legal standpoint, the evaluation of whether the watercourse described as "the Motwica" from km 15+600 to km 6+000 (i.e. to its joining the Szkło river oxbow) constitutes a natural watercourse or an artificial watercourse, and if it is artificial, whether it is a ditch or a canal in the understanding of the provisions of Water Law Act may also be significant.

Art. 9, para. 1, pt 13 of the Water Law Act provides that ditches are understood to be artificial channels carrying water constantly or periodically and of a width below 1.5 m at their mouth. A canal, meanwhile, according to point 5 of the cited article of law is recognised as an artificial channel carrying water constantly or periodically and of a bed width of at least 1.5 m at its mouth or intake. The classification of the Motwica under the provisions of the Water Law Act concerning the categorisation of ditches and canals will therefore depend on the width of the watercourse at its mouth. It is problematic, however, to determine where that mouth should be. This is because on the stretch of the Motwica in question there is a dividing of the waters between the Szkło oxbow and the ditch towards the San oxbow. It would seem correct therefore to determine the width of the Motwica at km 6+000 at the mouth to the Szkło oxbow, i.e. the transition between stretches I and II of the watercourse.

Therefore, the water of the Motwica carried as shown on the raster map of hydrographic division comes from the agricultural fields drained by the network of drainage ditches. The km 15+600 to km 6+000 stretch of the Motwica's channel constitutes a drainage ditch excavated in an area of riparian forest and wetlands. Further along, the waters are borne by the former channel of another watercourse – the river Szkło (Wisznia) – in order to 4,000 metres later reach the ditch to the river San.

The river Szkło (the former river Wisznia and Krakowska – Fig. 2) therefore has several effluences into the river San, beginning with what is currently the main one via the excavation of the old channel (the Motwica) to the oldest, shown in Figure 3.

Between the years of 1824 and 1855 the rivers Wisznia and Krakowska changed names, assuming the name of "the Szkło". The river Szkło also had a long stretch to the east of the town of Charytany. And so, all the way to the source of the former river Krakowska in the vicinity of the town of Jaworów this watercourse gained its new name – the Szkło. The course of the river Szkłó on the 1855 map is interrupted right at the town of Charytany (Fig. 5). This thesis is also confirmed by the contents of the Austrian cadastral map of 1851, sheets XVIII and XIX relating to the Laska community (Gemeinde Laszki) from the resources of the National Archive at Przemyśl, which show a watercourse channel with the designation "Szklo Bach" (Fig. 8).

Additionally, at the village of Podcharytany Fig. 9 shows a clear bifurcation of the szkło (formerly the Krakowska and Wisznia) in the direction of what is currently the Wisznia, which is also shown on other maps of this period (compare Fig. 5). It may therefore be assumed that the river today known as the Szkło went by other names (Krakowska, Wisznia) and had a longer course even as late as the 19th century. It was shortened by repeated engineering works, resulting in the stretches of oxbow currently functioning as drainage for the cut off catchment.

Art. 5, para. 3, pt 1 of the Water Law Act defines inland flowing waters as waters in natural watercourses, canals and watercourses' source springs; waters in lakes and other natural reservoirs with a permanent or periodic supply or outflow of surface waters; and waters in artificial reservoirs located on flowing waters. Meanwhile, inland standing waters are defined as being waters in lakes or other natural reservoirs not directly and naturally connected to flowing surface waters. In the case of the Motwica the essential question is where its waters come from. This is because, if its waters originate from springs this will mean that they must be counted as flowing waters, and any waters fed into the watercourse from drainage ditches will not influence this evaluation of their status. Meanwhile, the conducting of

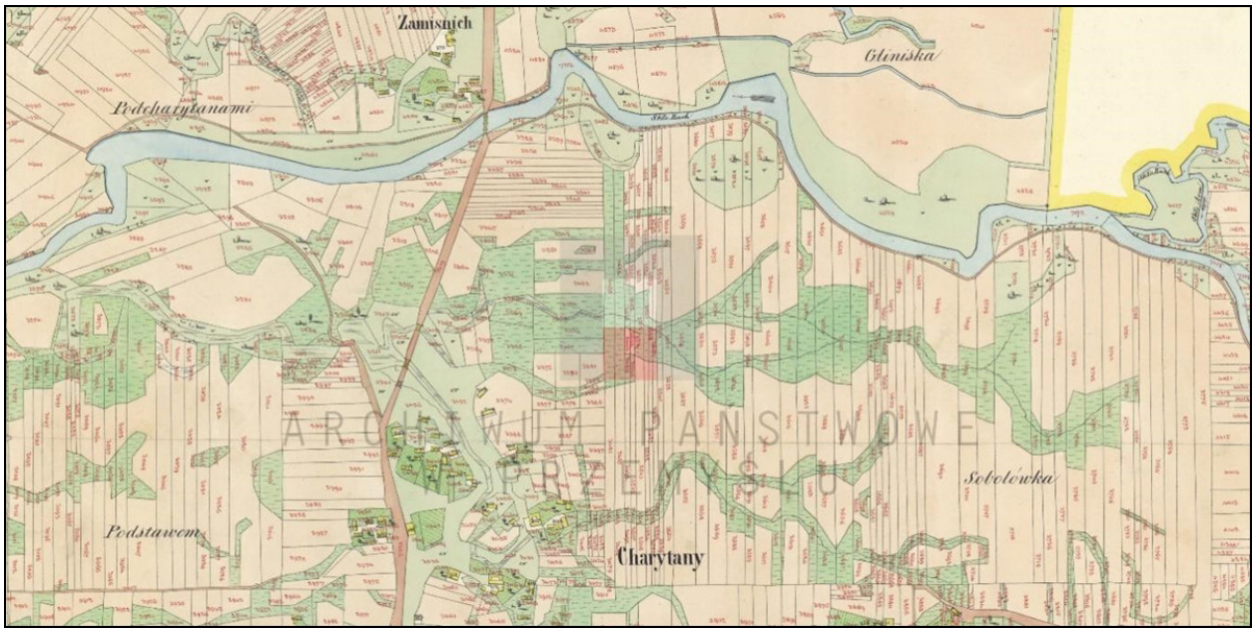

Fig. 8. Fragment of the 1851 Austrian cadastral map – area around the town of Charytany – the watercourse flowing through the village of Charytany on the map already bears the name "Szkło"

Fig. 9. Fragment of the 1851 Austrian cadastral map – area around the town of Podcharytany – depicting a bifurcation of the Szkło in the direction of what is currently the Wisznia

waters from water facilities in a fragmentary manner via the natural channel (stretch II) of the river Szkło, which was previously cut off from the upper catchment, changes neither the nature of the waters in the channel, nor that of the watercourse itself. Moreover, it is not changed by the fact of these waters being conducted by the canal (stretch III) and the San river oxbow (stretch IV) to its parent.

Article 70 of the Polish Water Law Act states that water drainage works are the engineering of water

relations for the purpose of improving the productive capacity of soil, facilitating its agricultural exploitation and protecting agricultural use against inundation, while the means of drainage themselves are classed as basic or specific, depending on their function and parameters. In accordance with art. 73, para. 1, specific water drainage facilities include ditches and structures associated with their operation. According to Bykowski and Przybyła (2012) the question of maintenance of canals and ditches is another problem, which derives from the difficulty in reconciling the two functions which drainage systems perform, those being the economic and the ecological.

Summary

There is no doubt that the Motwica should not be classified as a natural watercourse, because, firstly, the water flowing in its longest stretch comes from land drained in the 19th century. Secondly, the stretch from km 6 to km 1+900 of the watercourse is conducted by the river Szkło oxbow (formerly the Wisznia), which became disconnected from the upper catchment area as a result of the shortening of the river's course, and is therefore not the natural channel of the Motwica. Thirdly, the last stretch before its mouth passes through an artificial channel – a straight-line southwards-running ditch excavation, and then via a ditch through a dried-up oxbow of the river San left over by the engineering of the San in the second half of the 19th century.

The question of whether the waters of the Motwica constitute flowing inland surface water and belong to the Treasury or whether they derive from specific drainage works and belong to local landowners remains open and will require precise field measurement and analysis.

According to the provisions of art. 19, para. 1 of the Water Law Act, oxbows and remnant ground left by engineering structures shall remain the property of the existing owner of the water. Meanwhile, civil-law transactions on real-estate created by the cutting off of an oxbow from a main river channel, as per the example of the aforementioned engineering works, is entirely permitted.

Such a situation occurred in relation to the San oxbow shown on the above maps, which was included in a civil-law real-estate transaction as land for potential mineral extraction. Extraction of aggregates from the oxbow in this area has taken place at, among others, the towns of Zgoda, Wietlin and Surochów.

With regard to the artificial excavated channel section of the Motwica's course, the Marshal of the Podkarpackie Voivodeship intends to expropriate that section of land underlying the Motwica channel in order to realise a project entitled: Flood protection and surface water drainage in the Motwica stream catchment, in the Laszki community of the Podkarpackie voivodeship (Pol. Ochrona przed powodzią i odprowadzenie wód powierzchniowych w zlewni potoku Motwica, na terenie gminy Laszki, woj. Podkarpackie). On the basis of the regulations of the applicable law, the Marshal of the voivodeship is exercising the Treasury's owner rights over flowing surface waters. As can be read in the Resolution of the Podkarpackie Voivodeship Council, Resolution Nr XVI/282/15 of 15 November 2015 (Pol. Uchwała Sejmiku Województwa Podkarpackiego) the natural section of the Motwica is the property of a private company (which currently has a concession to extract aggregate from part of the bed which coincides with the watercourse's channel). The Podkarpackie Voivodeship Board of Land Amelioration and Water Facilities in Rzeszów has applied to the Jarosław community to restore and clarify the legal status of the land beneath the waters of the Motwica stream.

This situation is an example of the legal consequences of drainage works, including changes to the course of a river channel associated concurrently with wetland drainage works. As shown above, the environs of the town Jarosław in Podkarpackie were lands in which such works were conducted intensively in the 19th century. For this reason, it is not possible to assert with certainty that the Motwica is a natural watercourse, since its current character is the result of hydromorphological changes conducted in the right-bank tributaries of the San river.

The example of the Motwica demonstrates the need for greater interest in the problems described. This is because each hydrographic change in a river network can plainly change the apparent situation of a given watercourse. As shown in the example of the Motwica stream, the contents of the regulations

concerning public-property inland surface water, or parts thereof, is insufficient.

The question of engineering of watercourses and changes to their courses relates to many entities across Poland. In the face of plans for the enactment of a new Water Law Act, emphasis must be placed on the problem of the precise concept of flowing and standing surface waters and the legal conditions which must be fulfilled for a watercourse to be defined as one or the other.

A greater attention to the issues described here should also apply to investors, and none more than public entities planning engineering works in watercourses. The character of a given watercourse, including its categorisation (as flowing or standing water) should be arbitrated based on a thorough analysis of the available sources, including cartographic resources. Therefore, in this case, a detailed hydrological expert opinion on whose basis the classification of a watercourse can be verified in accordance with the Water Law Act is extremely important. Due to the long-term transformation of the geographical environment, the preparation of an expert hydrological opinion often requires consultation with other specialists in the field of physical geography, among others, geomorphologists, soil scientists or climatologists. They will make possible an unambiguous determination of the classification of a watercourse as standing or flowing water.

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