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THE INFLUENCE OF NEW LEGAL REGULATIONS ON THE METHOD OF DETERMINING THE AMOUNT OF FEES FOR DISCHARGING RAIN WATER AND SNOW WATER TO WATER

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ABSTRACT: In article was analyzed procedure of determining fees for water services connected with discharging rain water and snow water to water, as a result of the new Water Law, which came into force on the 1st of January 2018. First of all, authors compare the scope of water law permits – connected with the aforementioned matter – issued under the Water Law of 2001 (currently not in force) to those issued under the new Water Law of 2017 (currently in force since the 1st of January 2018). Authors indicate that – within the new Water Law – water law permit issued before the 31st of December 2017 is the fundamental source of information related to determining fees for discharging rain water and snow water to water. Such situation can lead to interpretational doubts of legal provisions related to the aforementioned matter. Results of the analysis conducted by the authors of this paper indicate crucial differences within amounts of fees for discharging rain water and snow water, paid by the obliged entities. Such differences result from the method of determining certain amounts of fees and also from the interpretation of the new Water Law and implementing regulations.

KEY WORDS: water services, water law, rainwater, fees for water services, rain fee

Introduction

Following Poland's accession to the European Union (EU), national provisions related to the management of water are formed mainly by regulations issued within EU. Policy of EU – while considering environment – contributes to achieving a reasonable and rational method of using natural resources. Such policy is aimed at reaching a high level of nature preservation, including differences within certain regions (Białek et al., 2018). While considering the usage of water and management of water resources, Directive 2000/60/WE of European Parliament and Council of 23rd of April 2000 is of fundamental importance. The Directive sets the scope of community activities within water policy. Art. 9 point 1 of the Directive shows that EU Member States – within provisions of their national law, which are currently in force – should take into consideration the rule related to refunds of fees for water services, including economic fees and expenses connected with materials (in other words "the one who pollutes has to pay"). What is more, the aforementioned Directive introduces legal definition of "water services": *"water services mean all services allowing households, public institutions or any other economic activity to: a) consume, dam up, store, treat and distribute surface or underground water; b) receive and treat waste, which is drained off to surface water afterwards"* (EU, 2000).

The issue of the water management and water services in the EU has been the subject of many publications (among others: Jekel, 2005; Unnerstall, 2007; Miłaszewski, Rauba, 2010; Gawel, 2015), but the system of water services in Poland is new, that is why the literature connected with the subject matter is poor and insufficient. Economic analysis (required by the aforementioned Directive and conducted by Białek et al., 2018) shows that in the years 2016-2017 the refund of fees for water services reached only 22-24%. Such situation caused introducing a new system of fees for water services in the new Water Law. The main issue was related to the rule of refunding fees for water services. Fees for water services were recognized as one of the five instruments related to management of water resources (art. 11 point 3 of the new Water Law) and as one of the nine economic instruments connected with water management (art. 267 point 1 of the new Water Law).

Introducing the new system of fees is a crucial change, especially for entrepreneurs, because now they must analyze the entire previous scope of water management. Decision-makers must choose how resources are allocated for rain water management and decide among the options available to reduce the impact of rain water to the receivers. At the same time, decision-makers must face problems related to costs and benefits of managing rain water including maintenance costs, and how the cumulative effects of

many decentralized and distributed projects across the city will impact rain water flows (Cousins, 2017). Until now, in many cities of Poland as well as abroad, it was required to pay fees for rain water for property under the impervious cover of land parcels (Burszta-Adamiak, 2014; McPhillips, Matsler, 2018). Establishment of such rain water fees was aimed at mitigating losses in the overall fee base and thus funds for maintaining and upgrading rain sewer infrastructure (Keeley et al., 2013). This provided additional revenue to fund maintenance of existing rain water control measures as well as to support development of new ones.

On the 1st of January 2018 the new Water Law (2017) came into force, introducing a reform of the water administration and management system. Amendment to the Water Law (the new Water Law, 2017) was the final step leading to implementation of the aforementioned Directive (EU, 2000) to Polish law.

As far as management of rain water and snow water is concerned, significant changes were introduced. Under the old Water Law, rain water and snow water were defined as wastewater, contained in open or closed drainage systems, coming from contaminated areas with permanent surface, in particular:
- cities, ports, airports,
- areas of industrial, commercial, service and warehousing purpose,
- transport bases,
- roads and parking lots (Art. 9, item 1, point 14 (c), old Water Law, 2001).

On the other hand, under the new Water Law, rain water and snow are no longer included in the wastewater category. They became a part of water services, defined as: *"discharging rain water and snow water to water, contained in open or closed rain sewage systems used for draining off rainfalls or contained in collective sewage systems within administrative borders of cities"* (Art. 35, item 3, point 7, the new Water Law 2017).

The new Water Law introduces a system of fees for water services, including, among others: discharging rain water and snow water to water, contained in open or closed rain sewage systems used for draining off rainfalls or contained in collective sewage systems (Art. 268, item 1. point 3 (a), the new Water Law, 2017). Under the new Water Law, fees for water services connected with discharging rain water and snow water, consist of a fixed fee and variable fee dependent on the existence of facilities for water retention from the sealed areas (Art. 270, item 11, the new Water Law, 2017). The amount of the fixed fee for discharging rain water and snow water is calculated as the product of the unit fee rate, period in days and maximum quantity of water, which can be consumed (measured in m3/s) – according to legal water permission or integrated permission. (Art. 271, item 4, new Water Law, 2017).

On the other hand, the variable fee is calculated as the product of the unit fee rate, the amount of consumed water expressed in m^3 and period in years, considering the existence of facilities for water retention from the sealed areas and capacity of such facilities (Art. 272, item 5, the new Water Law, 2017). Binding unit fee rates are provided in the Ordinance of the Council of Ministers related to unit fee rates for water services (currently Journal of Laws of 2017, item 2502). The amount of the fee is determined by State Water Holding – Polish Waters (in polish: Państwowe Gospodarstwo Wodne – Wody Polskie), which notifies the entities obliged to pay it in form of annual information containing the method of calculating the fee (Art. 271, item 1, the new Water Law, 2017). Pursuant to art. 271, item 4 of the new Water Law (the new Water Law 2017), the calculation of the fixed fee is based on information included in the water law permit. Under the amended Water Law, the permit for discharging rain water and snow water to water or to soil shall specify the maximum amount of consumed water in m^3/s, the average amount in $m^3/year$ and the actual and reduced surface area of the catchment drained by each outlet, the amount of rain water and snow water, and the average amount of rain water and snow water discharged to the facilities for the retention of water from sealed areas, expressed in m^3 per year (Art. 403, item 1, points 2 and 20, the new Water Law, 2017).

Under the old Water Law, fees for using the environment and discharging rain water and snow water to water and soil, were applicable (Art. 273, item 1, point 2, Law of Environmental Protection, 2001). In the legal situation that existed until the 31st of December 2017, if rain water or snow water was discharged to water or soil, the amount of fee was dependent on the size, type and method of development of the area from which such wastewater was discharged (Art. 274, item 4, point 1, Law of Environmental Protection, 2001). The amount of unit fee per 1 m^2 of contaminated area with a permanent surface was published annually in the announcement of the Minister of the Environment related to fees for the use of environment (Appendix 2, Table D, M.P. of 2016, item 718). Under the old Water Law, the water law permit for discharging rain water and snow water should specify the amount, state and composition of wastewater discharged to water, soil, or sewage systems or the minimum percentage of contamination's reduction in the wastewater treatment process (Art. 128, item 1, point 4, old Water Law, 2001). It should be mentioned that water law permits issued under the repealed Water Law remain in force (Art. 547, item 7, the new Water Law, 2017), which – in extreme cases – may refer to the period until the 31st of December 2027.

Under the old Water Law (2001) fees for discharging the rain water or snow water had to be paid by the owner of the rainfall sewage system's outlet, where the wastewater was discharged to soil, water or to water devices.

Similar situation occurs in the new Water Law, however with one exception – the fee have to be paid only for discharging the rain water and snow water to surface water. In most of the cases, communes are the owners of the sewage systems' outlets. Earlier, the communes could include collecting of the wastewater – coming from the rain or snow – in the fee tariff for water and wastewater, but today they can't do it, because rain water and snow water are no longer defined as a wastewater.

Sustaining the old water law permits in force cause problems related to the rights – expressed under the old Water Law and under the new Water Law – which are not the same in both of those cases. The main difference is connected with the information about the maximum and annual amount of rain water and snow water which has been discharged. Another problem is related to facilities used for retention of rain water and snow water: under the old Water Law, possession of such facilities wasn't required in water law permits or it was required, but only to the extent specified in the old Water Law; whereas under the new Water Law, water law permit must include possession of the aforementioned facilities. This may cause difficulties related to proper calculation of fees for water services connected with discharging rain water and snow water to water or soil, pursuant to water law permits issued under the old Water Law (old Water Law, 2001).

The main purpose of this article is to show the need to unify methods of calculating fees for rain water and snow water. Such need is connected with interpretational doubts related to the new Water Law, especially, while considering water law permits, issued before the 1st of January 2018.

Research methods

The authors analysed 50 water law permits for discharging rain water to water or to soil, issued under the repealed Water Law (old Water Law, 2001), selected randomly from publicly disclosed decisions on water law permit. They specify the scope of rights, which was systematised according to the adopted categories (table 1). The share of water law permits containing information that enables directly or indirectly to calculate the fixed fee (i.e. maximum transient runoff – Q_{max} maximum hourly discharge – $Q_{max.h}$, or maximum annual discharge – $Q_{max.yr}$ and the variable fee (i.e. maximum annual discharge – $Q_{max.yr}$, average annual discharge – Q_{yr}, average daily discharge – Q_d) was determined. The analysed decisions were issued by starostes of county, presidents of towns with county rights, voivodeship Marshalls and the Director of the Regional Water Management Authority in the years 2004-2017. The paper is based on the legal status of the new Water Law (new Water Law, 2017) as of May 31st, 2018.

Table 1. Categories adopted for the analysis of water law permits in terms of the contained information about the data characterizing the quantity of discharged wastewater (rainwater and snow water)

Category	Unit	Type of discharge according to water law permits	Characteristics of the category
Q_c	m³/s	calculated	This category includes water law permits that specified the amount of discharged water, without providing the maximum, hourly, average daily or annual values, etc.
	m³/s	total/cumulative	
	m³/s	Unit	
Q_{max}	m³/s	maximum [1,3]	This category includes water law permits that specify the maximum transient quantity of discharged water and unit-based or calculated discharge, but do not specify the maximum hourly and annual values and average daily values.
	m³/s	calculated	
Q_4	m³/s	calculated	This category includes water law permits that specify the value of maximum hourly and annual discharge, average daily discharge and calculated discharge.
	m³/h	maximum hourly [4]	
	m³/d	average daily [5]	
	m³/r	maximum annual [4]	
Q_{3C}	m³/h	maximum hourly [4]	This category includes water law permits that specify the value of maximum hourly and annual discharge and the average daily discharge.
	m³/d	average daily [5]	
	m³/r	maximum annual [4]	
Q_{4C}	m³/s	maximum	This category includes water law permits that specify the value of maximum transient, hourly and annual discharge and the average daily discharge.
	m³/h	maximum hourly [4]	
	m³/d	average daily [5]	
	m³/r	maximum annual [4]	
Q_{other}	m³/s	calculated	This category includes water law permits that do not qualify to the other categories.
	m³/h	maximum hourly [4]	
	m³/d	average daily [5]	
	m³/r	annual [2,3]	
Q_w	-	-	The water law permit does not specify the quantity of discharged waters.

1 amount required to calculate fixed fee under the new Water Law
2 amount required to calculate variable fee under the new Water Law
3 information required in the water law permit under the new Water Law
4 amount used for calculating fixed fee under the new Water Law, by converting indirectly into seconds
5 amount used for calculating variable fee under the new Water Law, including the amount of rainy days

Source: author's own work.

Pursuant to the water law permit (Decision of 2016) and the statement of water management conditions (Siwulski, 2016) for discharging rain water from the area of the city Strzelin to the Oława River – outlet W-IV, the authors conducted a simulation of the calculation of the fee, considering different interpretations of the method of determining input data for calculating the fee. The amounts of fixed and variable fee were calculated separately. The analyzed variants are presented in table 2, while table 3 presents the characteristic data of the drained area and the input data for calculations. The calculation of fixed and variable fee was based on the formula specified in the new Water Law (new Water Law, 2017). However, it was presented as a total annual fee, without dividing it into quarterly payment instalments. The basic rate of fee per unit was estimated, as the statements of water management conditions issued under the repealed Water Law (old Water Law, 2001) did not specify the volume of water retained in dedicated facilities. Comparative analyses, related to the amount of fee, included basic variant, which constituted variant 1 – for the fixed fee, variant 4 – for the variable fee and the sum of variants 1 and 4 – basic variant for the entire amount of annual fee.

$$FF - UR \cdot T \cdot Q_{max}, \tag{1}$$

where:
FF –   fixed fee [PLN],
UR –   unit rate determined pursuant to the Ordinance of the Council of Ministers (Journal of Laws of 2017, item 2502),
T –   time [days],
Q_{max} –   maximum transient quantity of discharged rainwater and snow water [m^3/s].

$$VF = UR \cdot T \cdot Q_{v.yr}, \tag{2}$$

where:
VF –   variable fee [PLN],
UR –   unit rate determined pursuant to the Ordinance of the Council of Ministers (Journal of Laws of 2017, item 2502),
T –   time [years],
$Q_{v.yr}$ –   annual quantity of discharged water [m^3].

Table 2. Analysed variants of the simulation of the amount of fixed and variable fee for discharging rainwater and snow water to water

Variant	Type of fee	Characteristics of the manner of calculating the fee
1	Fixed fee	Calculated directly from the Q_{max} specified in water law permit
2		Calculated indirectly: Q_{max} calculated basing on $Q_{max.h}$ specified in the water law permit or statement of water management conditions. $(Q_{max} = Q_{max.h}/3600*)$
3		Calculated indirectly: Q_{max} calculated basing on $Q_{max.yr}$ specified in the water law permit or statement of water management conditions. $(Q_{max} = Q_{max.yr}/31536000*)$
4	Variable fee	Calculated directly, based on the assumption that Q_{yr} correspond to the annual quantity of water discharged pursuant to the permit obtained or as specified in the statement of water management conditions. $Q_{v.yr} = Q_{yr}$
5		Calculated indirectly, as the product of the average daily quantity of discharged water and the number of rainy days (DP) specified in the statement of water management conditions. $Q_{v.yr} = Q_d \times DP$
6		Calculated as the product of the average total rainfall from the long-term period (Hm) and the drained surface area (F). (Filipek et al., 2018). $Q_{v.yr} = H_m \times F$
7		Calculated as the product of the total rainfall from the preceding year (H) and the drained surface area (F). (Filipek et al., 2018). $Q_{v.yr} = H \times F$
8		Calculated as the product of the average total rainfall from the long-term period (Hm), the drained surface area (F) and the runoff coefficient (φ) (Filipek et al., 2018). $Q_{v.yr} = H_m \times F \times \varphi$
9		Calculated as the product of the total rainfall from the preceding year (H), the drained surface area (F) and the runoff coefficient (φ) (Filipek et al., 2018) $Q_{v.yr} = H \times F \times \varphi$
10	Marshall's fee	Fee for the use of environment binding until the 31st of December, 2017, based on the unit fee rate (M.P. of 2016, item 718) and the size of the drained surface area.

* conversion per second: day, year.

Source: author's own work.

Table 3. Input data necessary for calculating the fixed and variable fee for discharging rainwater and snow water to water

Item	Parameter	Unit	Value	Data source
1.	Q_{max}	m^3/s	3.094	Decision of 2016
2.	Q_d	m^3/d	689.9	Siwulski, 2016
3.	$Q_{max.h}$	m^3/h	378.97	Siwulski, 2016
4.	$Q_{max.yr}$	m^3/r	1385757.7	Siwulski, 2016
5.	Q_{yr}	m^3/r	111588	Siwulski, 2016
6.	$Q_{v.yr} = H_m \times F$	m^3	548020	
7.	$Q_{v.yr} = H \times F$	m^3	574340	Own calculations based on data by Siwulski, 2016
8.	$Q_{v.yr} = Hm \times F \times \varphi$	m^3	137693	
9.	$Q_{v.yr} = H \times F \times \varphi$	m^3	144306	
10.	Long-term period rainfall (meteorological station Wrocław*)	m	0.583	Siwulski, 2016
11.	Rainfall in preceding year (meteorological station Wrocław*)	m	0.611	GUS, 2017
12.	Number of rainy days	-	160	Siwulski, 2016
13.	Drained area	ha	94.00	Siwulski, 2016
14.	Average weighed runoff coefficient	-	0.25	Own calculations based on data by Siwulski, 2016
15.	Green areas	ha	37.76	Siwulski, 2016
16.	Developed areas	ha	50.3	Siwulski, 2016
17.	Roads	ha	5.94	Siwulski, 2016
18.	Runoff coefficient – green areas	-	0.1	Siwulski, 2016
19.	Runoff coefficient – developed areas	-	0.3	Siwulski, 2016
20.	Runoff coefficient – roads	-	0.8	Siwulski, 2016
21.	Rate per unit FF (equation 1)	PLN per m^3/s	2.5	Journal of Laws of 2017, item 2502
22	Rate per unit VF (equation 2)	PLN per m^3	0.75	Journal of Laws of 2017, item 2502
23	Rate per unit – Marshall's fee	PLN per m^2	0.057	M.P. of 2016, item 718

* – meteorological station Wrocław was used in the statement of water management conditions (Siwulski, 2016) as characteristic for Strzelin

Source: author's own work.

Results and discussion

The fees for water services connected with discharging rain water and snow water should be charged only for discharging it to water. Pursuant to art. 268, item 1, point 3 (a) of the amended Water Law (the new Water Law, 2017), discharging rain water and snow water to soil is free of charge. On the other hand, Białek et al. (2018) claim that the provisions of Art. 268, item 1, point 3 (a), Art. 270, items 3 and 11, Art. 272, item 5, Art. 274, item 5 (the new Water Law, 2017) may be interpreted as a lack of obligation to pay the fees for water services connected with discharging rain water and snow water to water units, as the cited provisions on charges do not list the water units, although according to the definition of water services rain water and snow water is discharged to water units. Capturing rain water or snow water with the use of water melioration units is also exempt from charge, as it does not constitute a water service and is an example of using water which does not require obtaining a water law permit (Art. 395, item 13, new Water Law, 2017). However, one should bear in mind that not every ditch or reservoir is classified as a water melioration unit, because pursuant to Art. 195 of the amended Water Law (new Water Law, 2017), water melioration units consist in regulating water relations in order to improve the production capacity of soil and to facilitate its cultivation, and not every ditch or reservoir serves that purpose.

The analysis of water law permits issued under the repealed Water Law demonstrates that they are not homogenous in terms of the scope of the rights provided therein connected with discharging rain water or snow water to soil (figure 1).Water law permits that only specify the Q_{max} value, which enables to determine the fixed fee directly, had the highest share (28%), while permits specifying the Q_c value that does not allow the calculation of fixed fee accounted for 24%. On the other hand, permits specifying the values of $Q_{max.h}$, $Q_{max.yr}$, Q_d, which may constitute the basis for calculating the fixed fee indirectly, by converting $Q_{max.h}$ and $Q_{max.yr}$ into Q_{max} represented 26% of all permits. 2% of the permits did not specify the amount of discharged rain water and snow water at all. Altogether, 36% of the water law permits contained information about Q_{max} value that enabled to calculate the fixed fee directly, while 36% specified the $Q_{max.h}$, and 38% decisions specified $Q_{max\ yr}$, which may be converted to Q_{max} to calculate the fixed fee indirectly (figure 2). It should be noted that only 8% of the water law permits contained any information about the annual amount of discharged waters (Q_{yr}), which would enable to determine the amount of variable fee. On the other hand, 40% of the permits contained information about the daily amount of discharged

waters (Q_d), which may constitute the basis for calculating the annual amount of such waters indirectly (table 2).
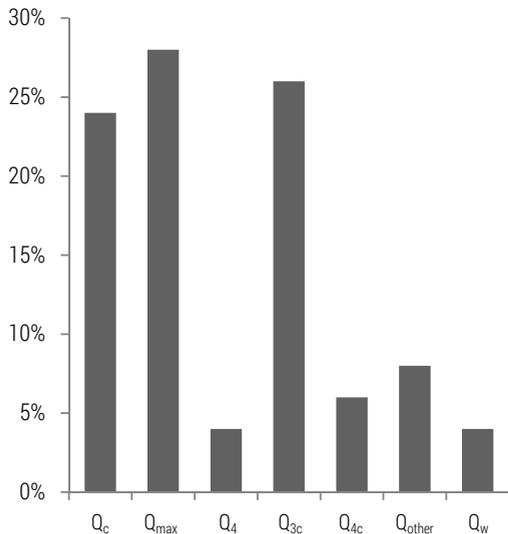
Figure 1.
Share of water law permits belonging to a category defined in Table 1 for the purposes of analysing the amount of discharged wastewater (rain water and snow water)

Source: author's own work.
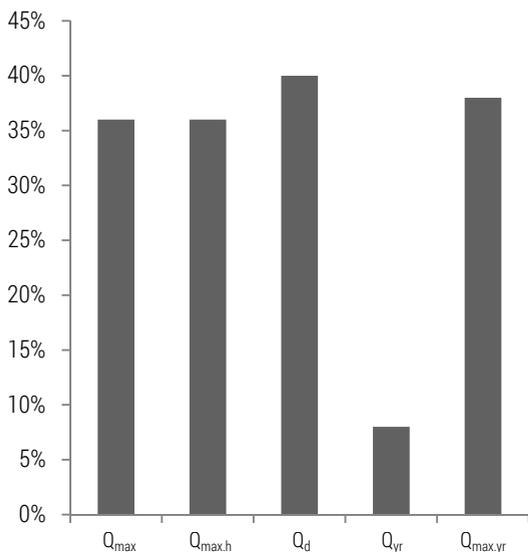
Figure 2.
Share of water law permits specifying a value characterising the amount of discharged rainwater that enables to determine the fee for discharging rain water and snow water to water

Source: author's own work.

Among all analysed water law permits, 30% contained all information (Q_4 and Q_{3C} categories) required for the determination of fixed and variable fee, provided that the Q_{max} and $Q_{v.yr}$ values may be calculated indirectly,

by converting them, respectively, from $Q_{max.h}$ or $Q_{max.yr}$ and Q_d. 6% of the water law permits (Q_{4C} category) specified Q_{max} thus enabling to calculate the fixed and variable fee indirectly, by converting Q_d into $Q_{v.yr.}$ 8% of them ($Q_{other\ category}$) contained information that enable to determine the fixed fee indirectly (by converting $Q_{max.h}$ into Q_{max}) and to calculate the variable fee indirectly or directly, respectively by converting Q_d and Q_{yr} into $Q_{v.yr}$. 44% of the water law permits altogether contained information that enable to simultaneously calculate the data required for the determination of fixed and variable fee, directly or indirectly, without the need to use additional information from the statement of water management conditions. It should be noted that none of the water law permits provided information about facilities for water retention in sealed areas or their capacity, which is necessary to determine the amount of unit rate for discharging rain water and snow water to water. In such event, the maximum rate is applied.

Depending on the adopted calculation variant (table 2), the amount of fixed fee may range from PLN 40 to PLN 2823 (figure 3). The highest fixed fee is charged if the Q_{max} specified in the water law permit (Decision of 2016) is applied directly, while the lowest one is obtained if $Q_{max.yr}$ is converted into Q_{max}. In the analysed case it is obligatory to apply the Q_{max}, as it is specified in the water law permit constituting the basis for calculation of the fee for discharging rain water and snow water to water (Art. 271, item 4, new Water Law, 2017). If the permit does not specify the Q_{max} value, only the $Q_{max.h}$ and/or $Q_{max.yr}$ instead, one may consider determining the Q_{max} value indirectly by converting $Q_{max.h}$ or $Q_{max.yr}$ (Filipek et al., 2018). However, this may result in a significant underestimation of the fixed fee, which might not reflect the fixed costs of discharging rain water and snow water to water. The amount of fixed fee calculated by converting $Q_{max.h}$ or $Q_{max.yr}$ may constitute, respectively, 3.4% and 1.4% of the fixed fee calculated basing on Q_{max}.

The judgments of administrative courts will become an important element in determining the fixed fees for water services. In the case concerning the fixed fee for using water services, the Voivodeship Administrative Court in Szczecin (II SA/Sz 514/18) stated that the legislator had not specified, which of the indicators provided in water law permits issued pursuant to the repealed Water Law ($Q_{max.h}$, $Q_{max.d}$ or $Q_{max.yr}$) should be used to calculate the fixed fee. According to the Court, the application of the $Q_{max.h}$ indicator is incorrect, as its use of waters is not constant, because it is limited by the value of $Q_{max.yr}$. The application of $Q_{max.h}$ results in charging a fee that does not reflect the costs of the actual, permitted and legal use of water services. Additionally, the water management authority, which calculated the fixed fee for using water services based on the $Q_{max.h}$ indicator of such use, as foreseen in the water law permit, contrary to the provisions of Art. 7a § 1 of the Code of

Administrative Procedure – "If the subject of administrative proceedings consists in imposing an obligation on a Party or depriving it from an entitlement or limiting the scope of its rights, and the case leaves any doubts regarding the content of the legal standard, these doubts shall be settled to the benefit of the party (...)", (Code of Administrative Procedure, 1960) failed to settle the doubts concerning the interpretation of the provision of Art. 271 item 2 of the amended Water Law (new Water Law, 2017) to the benefit of the party obliged to pay the fee and assumed a result that does not reflect the costs of actual, permitted and legal use of waters on an annual scale. However, in a similar case, the Voivodeship Administrative Court in Kielce (I SA/Ke 134/18) expressed a different opinion, arguing that the fixed fee is a subscription fee, payable for the Q_{max}, which is assumed to be the maximum value in m^3/s, converted, respectively, from $Q_{max.h}$, $Q_{max.d}$ or $Q_{max.yr}$, and the fact that $Q_{max.yr}$ was exceeded, is insignificant, as the fixed fee is by definition a permanent, lump-sum fee, i.e. a fee in a predefined amount and it is not related to the actual extent of use of waters.
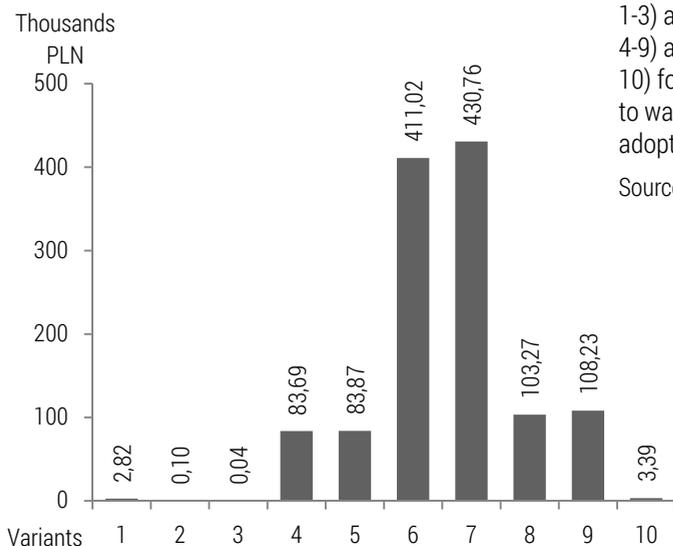
Figure 3.
Amount of fixed fee (variants 1-3) and variable fee (variants 4-9) and Marshall's fee (variant 10) for discharging rainwater to waters, according to the adopted calculation

Source: author's own work.

The authors prefer the interpretation adopted by the Court in Szczecin, because applying hourly indicator ($Q_{max.h}$) during calculatinos leads to increasing the amount of fee, whereas annual indicator ($Q_{max.yr}$) reflects the real level of the usage of water service. Moreover, exceeding annual (as well as hourly) level of usage is liable to a fine (art. 476 item 1 of the new Water

Law 2017, II SA/Sz 514/18). However, the absence of a uniform jurisdiction of the Voivodeship Administrative Courts and interpretation of Art. 271 of the amended Water Law (new Water Law, 2017) may lead to a chaos in the interpretation of the amount of the fixed fee calculated basing on the Q_{max} specified in water law permits issued under the repealed Water Law. Due to that, the judgments of the Supreme Administrative Court will be decisive.

The analysis of the amount of variable fee for discharging rain water to water depending on the adopted calculation variant (table 2) demonstrates that the fee may vary to a significant extent, falling into the range from PLN 83 691 to PLN 430 755.

The base variant adopted for the purposes of this study was the case, in which the amount of variable fee is calculated basing on the average amount of rain water discharged to water annually (table 4). As not all water law permits issued pursuant to the repealed legislation contain such information (which is missing, e.g. in the analysed case of Strzelin (Decision of 2016)), it became necessary to use the water low documentation (Siwulski, 2016). The lowest values of the variable amount were obtained when it was determined basing on the annual average (variant 4) and daily average (variant 5) amount of discharged rain water and snow water, although the difference between variants 4 and 5 is only 0.2%. On the other hand, definitely the highest variable fee was obtained for variants 6 and 7, where it was calculated basing on the rainfall intensity and the actual surface of the drained area (table 2). For variants 6 and 7, the amount of the variable fee exceeds PLN 410 thousand/year, and it is, respectively, 4.5 and 5.1 times higher than in the base variant. Still, it seems that these variants should not be applied, as only some of the rainwater from the total area will be discharged to the collector, while the rest will infiltrate to the ground or evapotranspirate (Liu et al., 2010; Walsh et al., 2012; Hasenmueller, Criss, 2013; Tokarczyk-Dorociak et. al., 2018; Zhang et al., 2018). Using the actual size of the total area at a specific rainfall volume for calculations results in an amount of the fee for discharging rain water and snow water to water that is disproportionately high in comparison to the amount of water that is actually discharged.

A better solution consists in using the reduced size of the total area (variants 8 and 9) that takes into account the runoff coefficient depending on the type of the drained area (Thompson, 2006; Królikowska, Królikowski, 2011; Kim et al., 2016; Szewrański et. al., 2018; Wang, Wang, 2018), and the amount of discharged water calculated in this way is more similar to the actual amount. In the analysed case, the amount of the variable fee calculated with the use of reduced area (variants 8 and 9) will be approx. 4 times lower than the fee based on the actual area (variants 6 and 7), but, respectively, 23.4% and 29.3% higher than the base variant 4. For variants 6-8, the volume of

rainfall plays a smaller, but still important role. The use of long-term period rainfall (variants 6 and 8) result in a value of fixed fee that may be lower than in the event of using the rainfall from the preceding year (variants 7 and 9) if it was higher than the long-term average. For variants 6 and 7 the difference is 23.6%, and for variants 8 and 9 by 5.9%.

It should also be noted that variants 6 and 8 refer to average long-term data, which results in the fact that the variable fee will remain constant for the whole validity period of the water law permit. What is important is the fact that the variable fee should not remain the same for the whole period of the water law permit. Such situation will occur as a result of applying variants 4, 5, 6 and 8, as they are based on the average values (variant 5 – Q_d, variant 4 – Q_{yr}) or on the average long-term precipitation (variants 6 and 8). These variants should be put aside because they do not meet the "variability" criterion. Additionally, it seems problematic to determine the number of rainy days, which are not specified in the water law permit, and are often missing from the statement of water management conditions as well. The free choice of the relevant (closest) meteorological station to determine the rainfall volume also seems questionable. The analyzed statement of water management conditions for the city Strzelin used data from the Wrocław station, although station IMGW No. ID 95341 is located in Strzelin (Jawecki, Burszta-Adamiak, 2014; IMGW-PIB, 2018). It seems more justified to use the rainfall from the preceding year to calculate the amount of variable fee, as it allows to set the fee for a near to actual amount of rain water and snow water discharged to water, and the fee will vary in the subsequent years of validity of the water law permit.

Table 4 presents the total annual amount (sum of the fixed and variable fee) for discharging rain water and snow water to water. The intersection of each column and row contains the total amount of fee constituting the sum of the calculation variants. The total fee varies significantly in the range from PLN 83731 (variant 3 + wariant 4) to PLN 433578 (variant 1 + wariant 7). The comparison of the sum of base variants (1+4) with the amount of the Marshall's fee paid until 2017 allows to determine that the value of the latter accounts for only 3.9% of the sum of base variants.

According to the analysis of the adopted base variants (table 2), the availability and scope of input data (table 3), the potential amount of the fee for discharging rain water (table 4) and the statutory requirements concerning the necessity of using data from water law permits (Art. 271, item 4, new Water Law, 2017), it seems that some of the calculation variants should be put aside. Variants 2 and 3 that constituted the basis for determining the Q_{max} value and the amount of the fixed fee result in significantly underestimated fee amounts. However, if it is impossible to apply Q_{max} directly, it is recom-

Table 4. Sum of the fixed and variable fee for discharging rain water and snow water to water in the analyzed variants

Variable fee \ Fixed fee	Variant 1	Variant 2	Variant 3
Variant 4	PLN 86514	PLN 83787	PLN 83731
Variant 5	PLN 86691	PLN 83964	PLN 83908
Variant 6	PLN 413838	PLN 411111	PLN 411055
Variant 7	PLN 433578	PLN 430851	PLN 430795
Variant 8	PLN 106093	PLN 103366	PLN 103310
Variant 9	PLN 111053	PLN 108326	PLN 108270
Variant 10		PLN 3386	

Source: author's own work.

mended to calculate this value indirectly from $Q_{max.yr}$, according to the interpretation of the Voivodeship Administrative Court in Szczecin (II SA/Sz 514/18). On the other hand, variants 6 and 7 lead to a significant overestimation of the variable fee, as they do not take into account the infiltration and evapotranspiration of some of the rainwater. On the other hand, variants 4 and 5 calculate the amount of variable fee based on the average daily (Q_d) or annual (Q_{yr}) volume of discharged water, and as a result, the variable fee becomes "fixed" for the whole period of the water law permit, losing its "variable" characteristics. Variants 6 and 8 may be criticized similarly, as they use the average long-term rainfall to determine the amount of rain water and snow water discharged to water. Basing on the conducted analyses it seems reasonable to suggest that the optimum method of calculating the fee for discharging rain water and snow water to water will be the method specified in variants 1 and 9, where, for the analyzed facility, the total annual amount being the sum of fixed amount in variant 1 and the variable amount in variant 9 equals PLN 111053. It should be noted that in the analyzed case the amount of the fee due for water services connected with discharging rain water and snow water to water will be 33 times higher than the Marshall's fee paid until the end of 2017 for discharging wastewater from rain and snow to the environment.

Conclusions

The conducted research allowed the Authors to formulate the following conclusions:

1. The water law permits issued under the repealed Water Law do not contain all the information required by the amended Water Law that is necessary to calculate the fee for discharging rain water and snow water to water. Due to that, pursuant to the new legal regulations, there is a need to use data from statements of water management conditions or data of the Institute of Meteorology and Water Management to determine the amount of the fee.

2. Only 36% of the analysed water law permits issued pursuant to the repealed Water Law provided the information about maximum temporary amount of discharged rain water and snow water (Q_{max} in m^3/s) that enables to calculate the fixed fee for such water services directly.

3. 8% of the analysed water law permits issued under the repealed Water Law contained information about the annual average (Q_{yr} in m^3/yr) amount of discharged rainwater and snowmelt, while 40% contained information about the daily average (Q_d, in m^3/d) amount of discharged waters, which enables to determine the variable amount for this type of water services indirectly.

4. The analysis of variants, which were used for calculations, showed crucial meaning of those variants while considering evaluation of aggregate fee for discharging rain water and snow water. This may lead to underestimating or overvaluing the amount of fee or – in extreme cases – the amount of the fixed fee can constitute 1,4% of a base variant or the amount of the variable fee can be 5,1 times as big as the base variant.

5. As a result of using average values (Q_d, Q_{yr}, H_m) to calculate the annual amount of discharged rain water and snow water, the variable fee will remain constant for the whole period of validity of the water law permit, losing its "variable" characteristics, nevertheless it can change per every year.

6. As a result of the differences in the scope and form of data (m^3/s, m^3/d, m^3/yr) related to the amount of the discharged rain water specified in water law permits issued pursuant to the repealed Water Law will have to develop a uniform methodology of calculating the fee for discharging rain water and snow water to water for the whole country.

7. In the opinion of authors, it seems reasonable to use the method that uses Q_{max} directly (fixed fee – variant 1) and the algorithm considering the rainfall amount for the long-term period from the nearest meteorological station as well as the reduced size of the drained area (variable fee –

variant 9) to calculate the total fee for discharging rain water, because it includes requirements related to the new legal provisions and it doesn't overvalue or underestimate the amount of the fee.

The contribution of the authors

Bartosz Jawecki – 70% (research concept and design, collection and/or assembly of data, data analysis and interpretation, writing the article, final approval of article).

Marcin Sobota – 15% (writing the article, critical revision of the article, final approval of article).

Ewa Burszta-Adamiak – 15% (writing the article, critical revision of the article, final approval of article).

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