People's knowledge, opinions and interests about small waters in Tallinn

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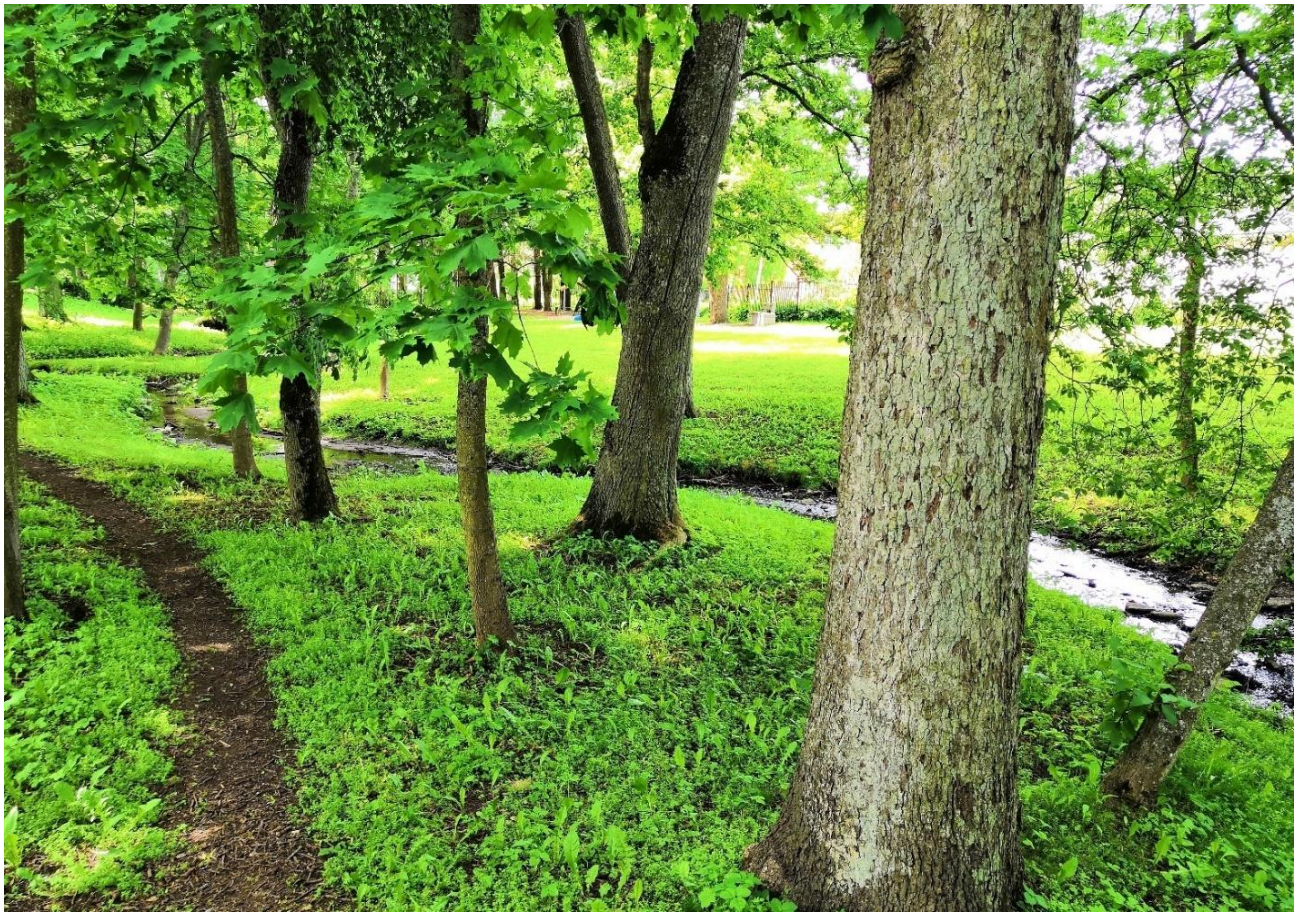

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Photo in the cover by Ljudmila Vesikko (SYKE)

1. Introduction

In cities, human activities have significant and direct impacts on the state of urban nature. This also applies to the status of urban water bodies and small waters. Rainwater often ends up untreated in urban streams and other urban water bodies, degrading their condition. In addition to the quality of stormwater, problems can also be caused by rapid and extreme fluctuations in their volumes. Heavy rains, which are becoming more frequent as a result of climate change, may contribute to increasing stormwater floods, thus affecting the lives of people and the rest of urban life. Long rainless summer seasons, in turn, can drain at least smaller urban streams. Although city streams are often close to people living in cities, they can nevertheless receive very little attention. Therefore, many people do not comprehend the impact of small and everyday human activities on their condition.

The survey presented in this report was a part of the international Heawater project (Achieving healthier water quality in urban small rivers of the Baltic Sea catchment by restoration of water bodies and preventing of nutrients and hazardous substances inflow from watershed), an EU project funded by the Interreg Central Baltic Programme 2018–2021. Participants in the project were the City of Tallinn (the leading partner), Tallinn University of Technology in Estonia, the municipality of Söderhamn in Sweden, the Finnish Environment Institute (SYKE) and Turku University of Applied Sciences (TUAS) in Finland.

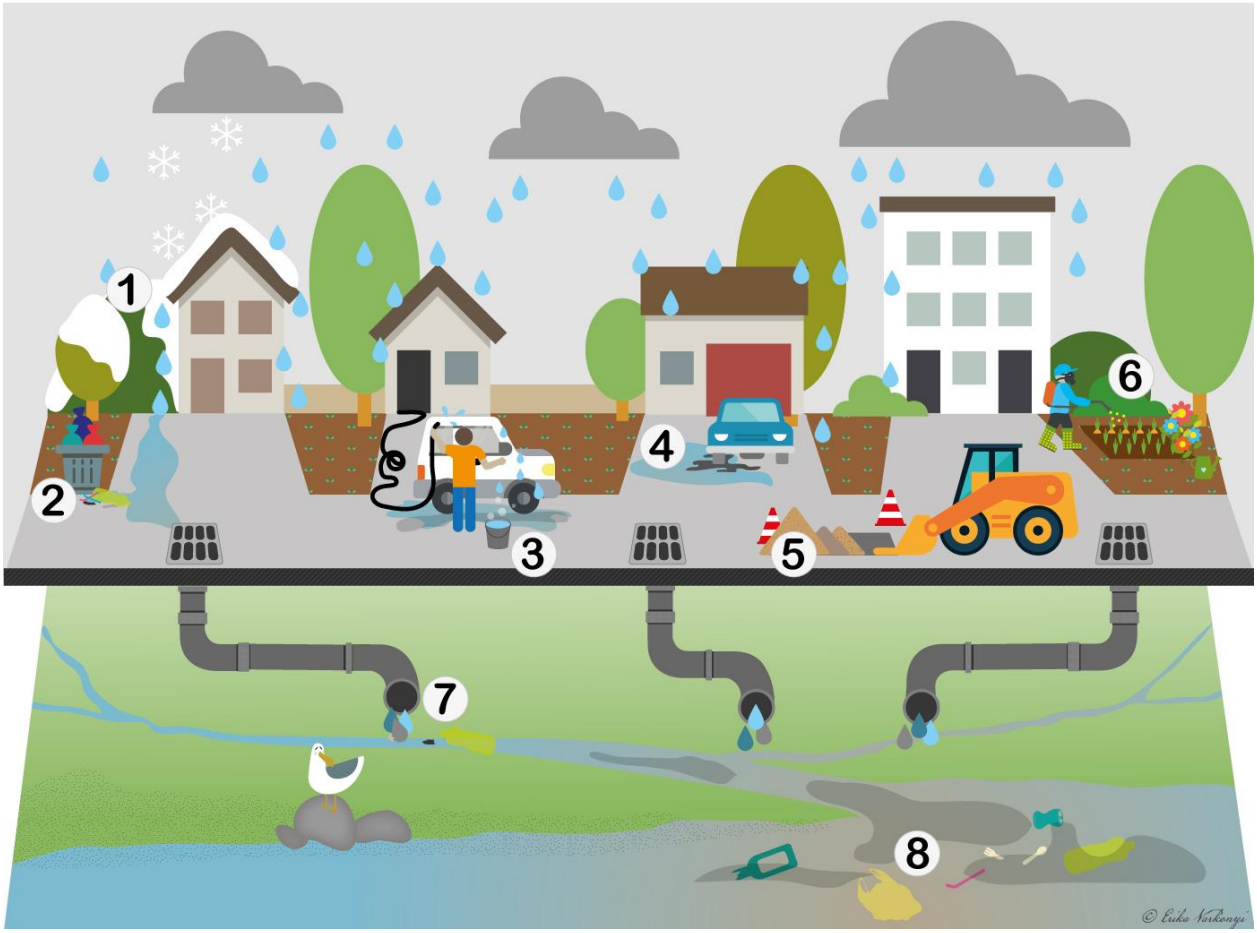
The overall goal of the Heawater project was to demonstrate possible and sustainable solutions to achieve better water quality in small, urban watercourses around the Baltic Sea. In addition, the aim was to raise awareness of the benefits of better water quality in small urban streams and the impact of streams on human well-being. The target areas of the project were the city of Turku in Finland, the municipality of Söderhamn in Sweden and the city of Tallinn in Estonia.

As part of the Heawater project, surveys were conducted in Turku, Söderhamn and Tallinn on the attitudes and willingness of residents to improve the condition of small waters and the sustainable management of stormwater in their area. The method used was the contingent valuation method, which aims to quantify the impact of environmental change on people's well-being using a carefully designed survey (see for example Champ et al. (2003)). A scenario is created for the survey to assess willingness to pay (WTP). In this project, the scenario described what environmental changes would be seen in small urban waters after new and more sustainable restoration measures. The environmental changes described were reduced flooding, an improved water status, increased recreational opportunities, increased spawning grounds for fish and more diverse habitats for birds, mammals and insects in water front. For the implementation of the presented scenario, respondents were asked if they were willing to pay a monthly (or annual) payment in the future. The results of the surveys were used to evaluate the overall benefits of improving the status of small waters. The overall environmental benefits could then be compared with an estimate of the cost of measures to achieve this change.

This report describes the implementation of the survey in Tallinn, one of three pilot areas in three countries. This report describes the implementation of the survey, its' results and shows the results of light social cost-benefit analysis. The Estonian version can be found in the country specific Deliverable (Lehtoranta et al. 2020, Deliverable 3.1.2). The Estonian version of the questionnaire can be found in Appendix 2 in this Deliverable.

2. Survey

The survey also served as a communication tool, as in addition to the 25 questions, it contained a large amount of up-to-date information on small urban waters and their status, as well as stormwater management in each survey area. The survey texts followed the same pattern in all three areas but were tailored to suit each target area. The survey also told about stormwaters in general and about sustainable stormwater solutions, as stormwater affects the state of small urban waters. All surveys used the same images drawn in the Heawater project for surveys and environmental education purposes. The images illustrated the formation of stormwater and aspects that can influence its quality, as well as different stormwater treatment practices. These images are presented in Appendix 2. The surveys also included a number of questions about respondents' attitudes, opinions and level of knowledge. These attitudinal and background questions are essential in the contingent valuation method.



1. Metals and other hazardous substances from building roofs are released into run-off water
2. Litter from waste receptacles may fall into run-off water and be carried along with it
3. Car washing soaps, among other things, run untreated from residential yards into the watercourse and can be hazardous to living organisms
4. Oil or other substances can leak from poorly maintained vehicles into run-off water
5. Soil from construction work is often carried away by run-off water
6. Pesticides and excess nutrients are easily carried by run-off water into watercourses
7. Run-off water from drainage pipes usually end up untreated in brooks and rivers
8. Litter and hazardous substances are also carried by brooks and rivers into lakes and the sea

Figure 1. Illustration used in the questionnaires about stormwaters and how peoples' activities influence them.

2.1 Study area

Tallinn, the capital of Estonia, has a population of about 445,000. The Pirita River is the longest of the 16 rivers and streams in the Tallinn city area and it is more than 100 km long. Many of the streams are shorter than ten kilometres and some of them have been moved to run through pipes under the city. In the past, streams served as wastewater passageways and discharge points, but today, they are mainly used as stormwater ways. As a result, the natural catchment area of some streams has increased and the hydrology and water quality have changed. According to measurements, the ecological status of the water of the Mustjõe and Tiskre streams is poor. The water quality of Lake Harku, from which the Tiskre stream originates, is also poor. The water quality of the Mustjoki River has deteriorated, especially due to the contaminated stormwater discharged into it from streets, industrial areas and construction sites. Monitoring of the water quality of the Mähe River did not begin until 2019, but its condition also appears to be poor.

As shown in Figure 2, the survey was targeted at residents of three residential areas, namely Pirita, Haabersti and Kristiine. The areas were selected based on the small surface waters located in them. The Mähe stream (Mähe oja) runs in the Pirita area and the Mustjõe and Tiskre streams are in the Haaberst area. The Kristiine area was also selected for the study because the Mustjõe stream runs underground in this area and most of the stream's catchment area is in this area.

The survey was conducted in Estonian as a paper and Internet survey in early 2020. The survey was targeted at a random sample of city residents aged 18–80 years, one person per household. The sample (n = 2,500) was divided between three selected areas according to the known population: Pirita (467 people), Haabersti (1190 people) and Kristiine (843 people). In addition, the sample was targeted at 1509 (60%) Estonian-speaking and 991 (40%) Russian-speaking recipients. Although many Russian-speaking native speakers were known to live in the area, the survey was conducted only in Estonian. SYKE received addresses from the Estonian Ministry of the Interior (Siseministeeriumi infotehnoloogia- ja arenduskeskus). The Finnish Environment Institute was responsible for preparing the surveys with the help of local partners, while mailing of the survey was handled by JP Postitus Oy.

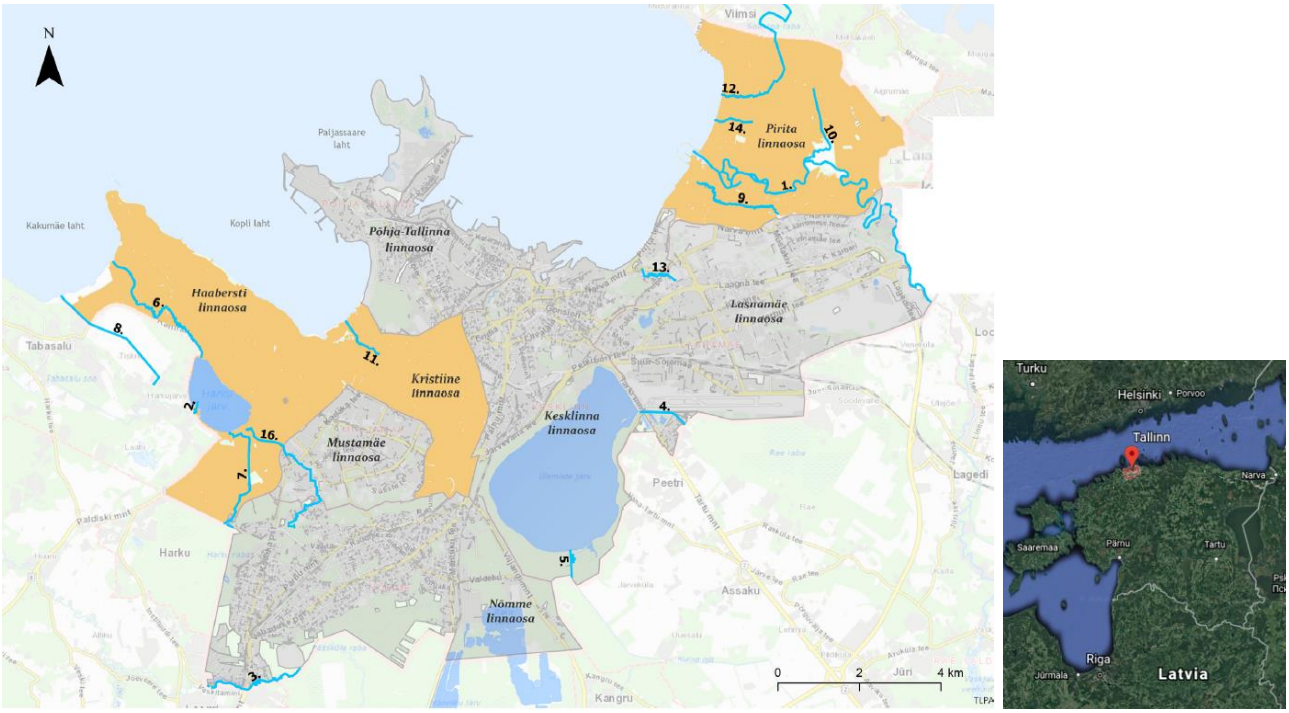


Figure 2. Three study areas, Haabersti, Kristiine and Pirita, in Tallinn @City of Tallinn

2.2 Survey implementation and response activity

The questionnaire was tested in November 2019 by employees of the City of Tallinn by sending it to a total of ten people. Based on the comments received from the testers, a few questions were refined. To increase the response rate and representativeness of the data, respondents were contacted three times. First, a paper questionnaire with a cover letter was mailed to the recipients in March 2020. The cover letter was signed by the Mayor of Tallinn, Mihhail Kõlvart, and it described the ongoing survey and provided the address of the Internet survey.

Those who had not yet responded to the questionnaire were reminded once or twice with a reminder card. The tentatively planned fourth contact was nevertheless not made, as the number of responses had already decreased significantly in the third round of the survey. The Internet survey was kept open until the end of May 2020. In addition, a short questionnaire was sent to several non-respondents (n = 400) in June 2020 to ask for the reasons that contributed to their non-response.

Time table of the mailings was as follows:

1st mailing: Paper questionnaire and cover letter 1 were received around February 28th and time to answer until March 15th.

2nd mailing: Reminder card 1 was received around March 20th and time to answer until March 31th.

3rd mailing: Reminder card 2 was received around April 9th and time to answer until April 20th.

Thus, respondents were contacted three times between February and April 2020.

2.3 Basics about the respondents

In total, 323 responses were received. After eliminating empty replies, double replies and protest replies, the final data had 311 respondents, representing a response rate of 12.4%. The response rate can be considered quite low.

The response rate was higher among Estonian-speakers than among Russian-speakers (16% vs. 7%). As the number of responses was slightly lower than expected, it was necessary to compare the obtained data with the sample / population by other means. Perhaps the COVID-19 pandemic at the time affected either the mailing of questionnaires or willingness to respond.

Slightly more than half of the respondents (54%) returned the questionnaire by mail and 46% returned their answers electronically. During the survey, several communication campaigns were carried out by the City of Tallinn. In all three sub-study areas of Tallinn, articles on the Heawater project and research were published in local journals. In addition to these, the topic was covered on the Internet, TV and radio.

Tables 1-3 summarize basic information about the respondents and this information was compared with the population to assess the goodness of the data. About 58% of respondents were female and the average age of the respondents was about 53 years. The share of Estonian speakers among the respondents was clearly higher than the share of native speakers of Russian. The survey questionnaires were only sent in Estonian, which most certainly explains the difference. Families with children accounted for about 39% of respondents, and only a small proportion of respondents (about 2%) reported being a member of an environmental organization (Table 1). A total of 38% of the respondents had a master's degree and 3% of the respondents had a doctoral degree.

Most respondents (66%) lived in an apartment building, one in four in detached houses and less than a tenth in semi-detached or terraced houses. The average household income was asked as a categorical variable. Based on the responses, the median household income (gross) was about EUR 1,200 to EUR 1,799 per month in 2019. Responses were received from all three regions, as shown

in Table 2. In relation to the population, the response rate was higher in the Pirita than in the Kristiine district.

Table 1. General information on the respondents

	Respondents (n = 311)
Native language: Estonian	79.1%
Native language: Russian	20.9%
Women	58.1%
Families with children	39.0%
Average age	52.9 years
Member of an environmental organization	2.3%

Table 2. Distribution of the respondents in the three sub-areas of the study.

Sub-area	Respondents	Percentage of the whole study area
Haabersti	153	49%
Kristiine	84	27%
Pirita	74	24%
Total	311	100%

Table 3. Age groups of respondents

Age group (years)	Respondents	Percentage
18–29	24	9%
30–39	56	20%
40–49	64	23%
50–59	43	15%
60–69	49	18%
70–79	49	18%
80–93	18	6%
Total	279	100%

2.4 Willingness to pay scenario in the questionnaire

The scenario of the survey stated that additional funding would be needed to improve the condition of Tallinn's urban streams and to implement more sustainable ways of treating stormwater. It was further noted that one way to increase funding would be to introduce a stormwater tax. The proceeds of the stormwater tax could be used not only to improve the status of urban waters, but also to develop stormwater solutions and introduce more sustainable solutions. In addition, the biodiversity of small urban waters could be improved.

Next, a scenario to improve the status of urban streams and stormwater management was presented. It was stated that after the implementation of sustainable stormwater measures, water delay systems such as ponds and ditches would reduce flood damage. Furthermore, stormwater from new residential areas would be diverted through wetlands to urban streams, rivers and lakes, places for recreation would be built along streams, the streams and their surroundings would provide more diverse habitats for animals, insects and plants, and the streams that currently go underground in pipes would be exposed to the surface as part of the urban environment.

3. Results and their review

3.1 Use of waterways and perceived water quality

Two out of three respondents said they lived less than two kilometres from a city stream, but 7% couldn't say. The survey also asked how respondents felt about the current water quality of Tallinn's city streams or waters. Throughout the study area, only one respondent rated their condition as excellent and only five out of a hundred as good. About one-fifth thought they were in a satisfactory state. Most (43%) considered their condition passable. Their state was considered to be in poor condition by 2% of respondents. Less than a third could not say what state they thought the urban streams were in.

Water quality was perceived slightly differently between the districts. In the Haabersti district, two out of three considered the water status to be passable, while in the Pirita district more than 40% considered the water status to be satisfactory. In the Kristiine district, on the other hand, more than half could not assess the state of the waters. (Figure 3.)

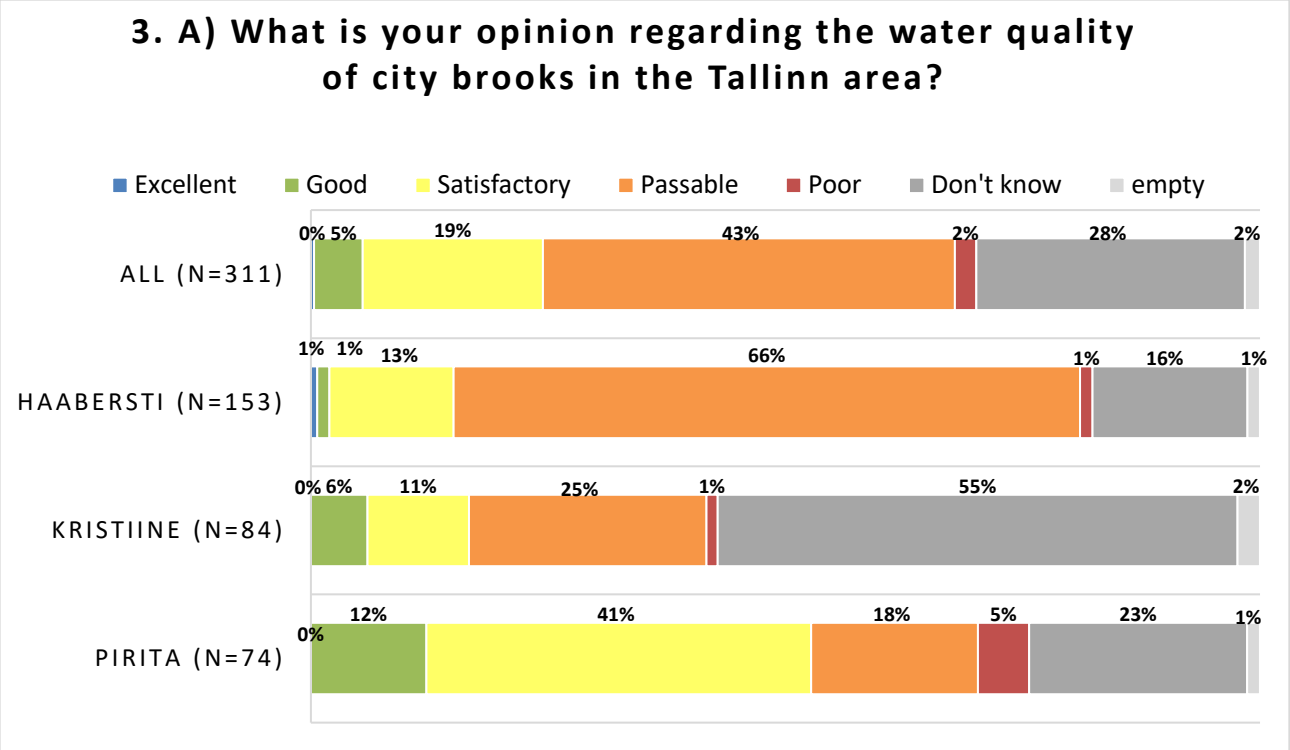


Figure 3. Respondents' perceptions of the water quality of Tallinn's urban streams.

The survey also mapped how Tallinn residents use different types of areas for recreation. The most popular among the respondents was spending time by the streams, which was done weekly by more than 10% of the respondents. The next most popular was outdoor activities by the sea, then at ponds and Harku Lake (Figure 4).

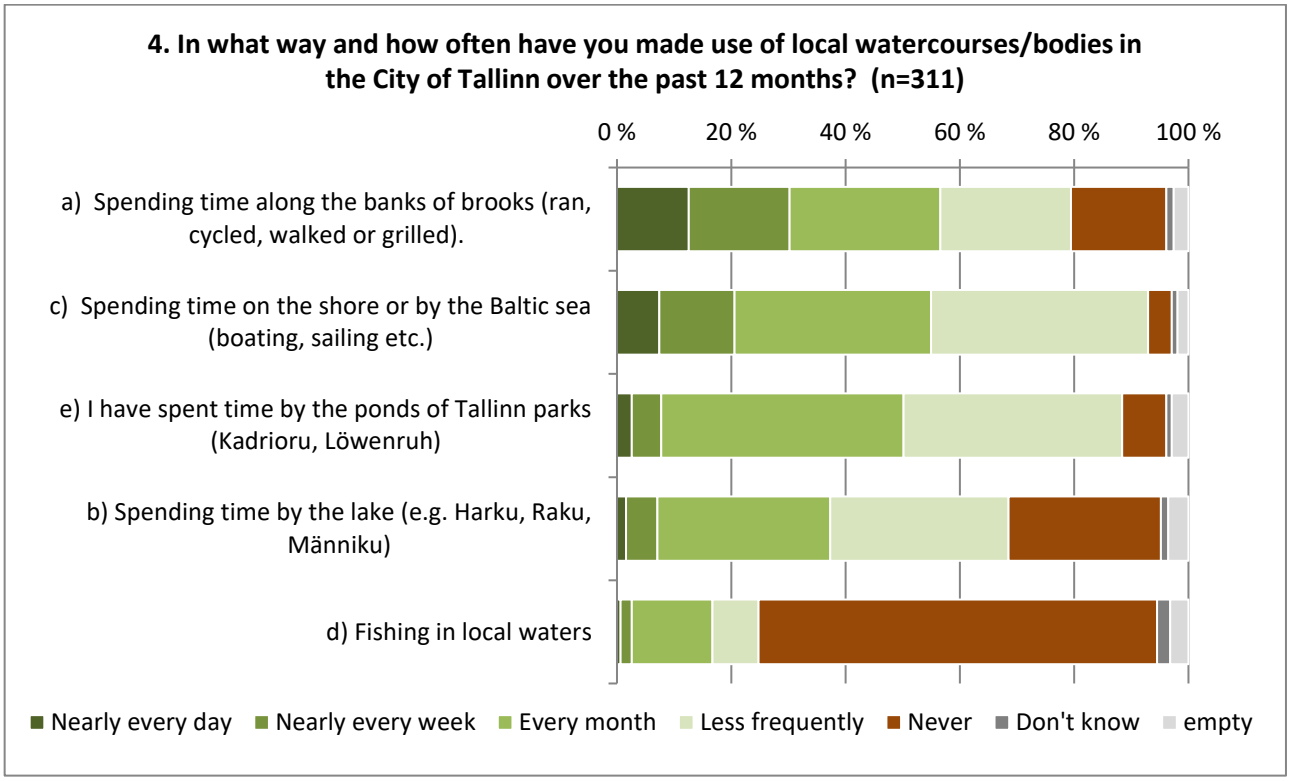


Figure 4. Respondents' outdoor habits during the last year.

At the beginning of the survey recipients were asked whether social funding for various topics considered important in the area should be changed. The purpose of the question was to assess how the respondents perceived the importance of funding for the protection of small urban waters in relation to other important and publicly funded issues in the region. By far the most important of the options presented was the protection of the Baltic Sea, which was very important to more than half of the respondents. Improving the water quality of urban streams was very important to 38% of respondents.

Later in the survey they were asked for opinions related to nearby waters. About eight out of ten respondents were concerned about the state of the Baltic Sea (Figure 5). Almost as many thought city streams should be a more visible part of the cityscape. More than three out of four were also concerned about the condition of Tallinn's city streams in general. About 70% felt that urban streams were important to them, but a fifth neither agreed or disagreed with this.

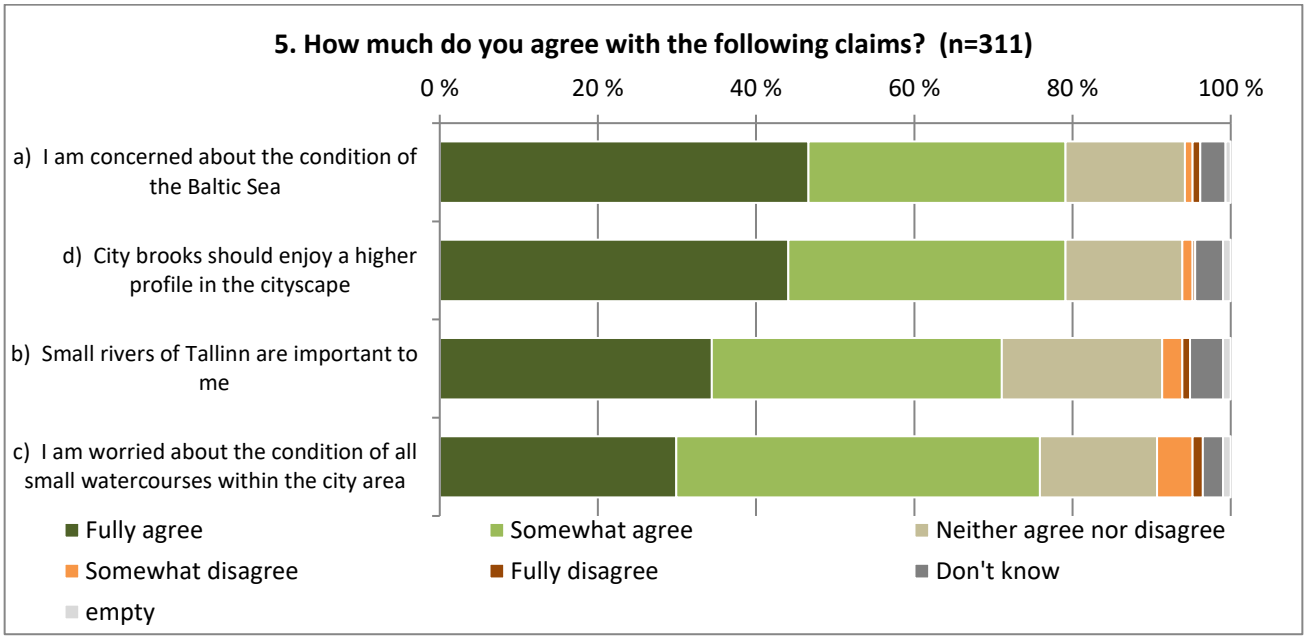


Figure 5. Respondents' opinions on the state of the Baltic Sea and urban water bodies.

3.2 Stormwaters and their sustainable management

The quantity and quality of urban stormwater is crucial to the state of city streams. Usually, stormwater ends up in city streams, rivers or the sea, untreated through sewers on the streets. A picture was drawn for the survey to illustrate this direct relationship between stormwater and natural waters. It was also intended to communicate which human activities have a particular impact on stormwater quality.

Respondents were also told about the formation of stormwater. They were then asked if they had ever heard of stormwater. Most respondents said they already knew what stormwater meant (Figure 6). However, over third responded that there was something new to them in the text and picture presented to them. Only two out of 100 respondents had no idea what stormwater meant and over a tenth did not answer the question.

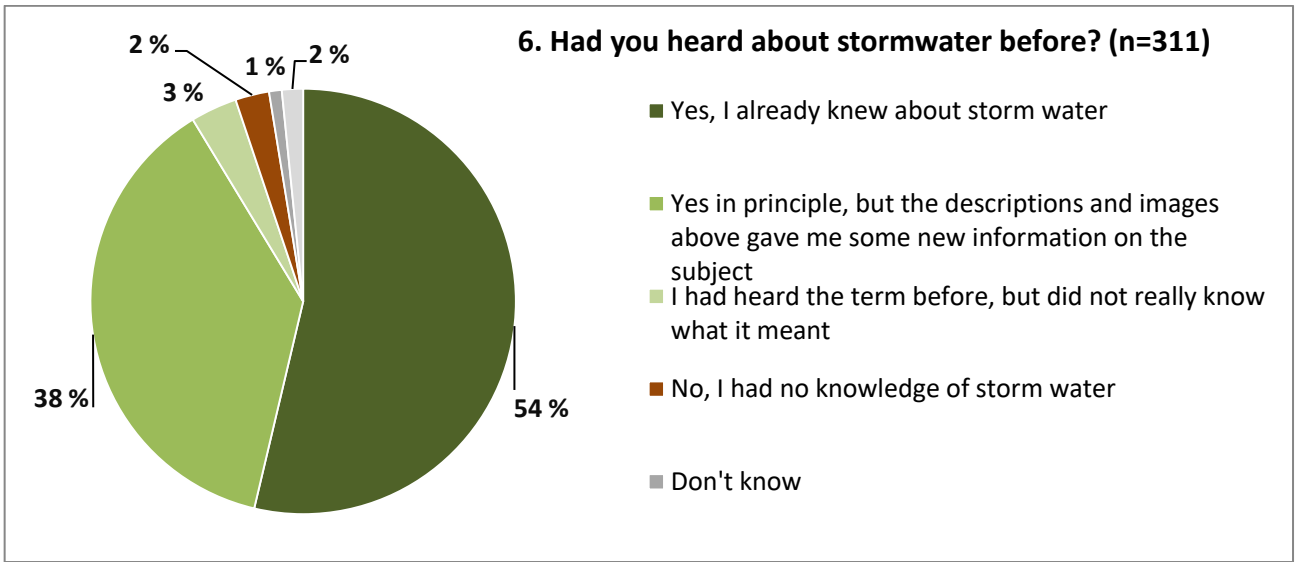


Figure 6. Familiarity of stormwater among the respondents

About 40% of respondents thought that untreated stormwater should not be discharged directly into urban natural waters. One-tenth fully and 29% to some extent thought that they could influence the state of urban streams through their own actions. Almost as many believed that urban floods had increased over the past ten years. Only one in ten respondents felt that the quantity or quality of stormwater was not a problem in Tallinn. Even fewer thought that the condition of city streams had improved in recent years. (Figure 7)

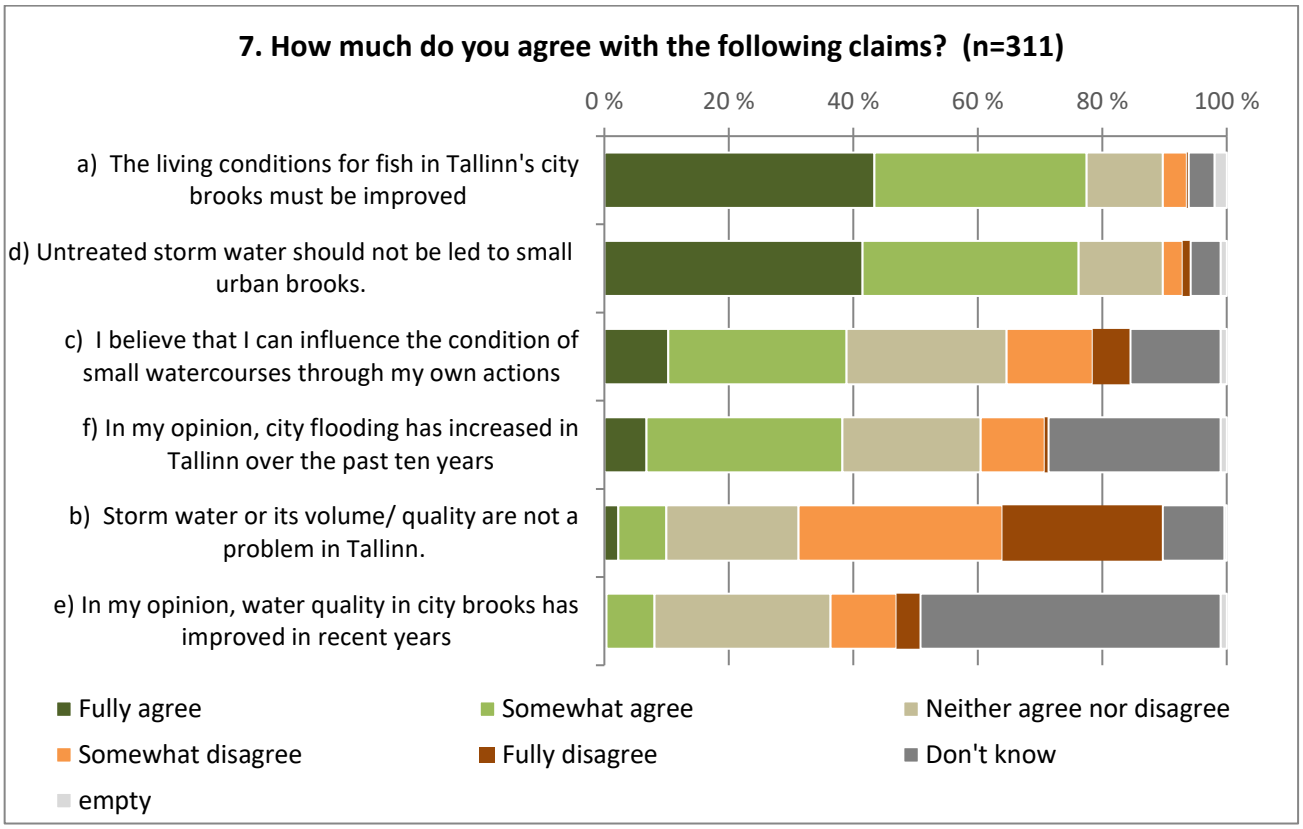


Figure 7. Respondents' opinions on urban water bodies and stormwater

Respondents were described in more detail on the effects that sustainable management of stormwater could have. The texts of the topic and the images drawn in the Heawater project can be found on page 7 of the questionnaire (Appendix 4).

Respondents were asked if sustainable water management could make a difference for themselves or for the inhabitants of the district. Almost 80% believed that it would have major or moderate positive impact on the attractiveness of Tallinn (Figure 8). Equally many assumed it would have major or moderate positive effects on the city's image and reputation. About 70% assumed that it would have the same effects on their own nature experience as well as on the mental well-being of the citizens'. Slightly less than half of the respondents assumed that it would have a large or moderate positive effect on the number of their recreational visits to city streams. For all options, 3% to 17% did not believe that natural stormwater management would have such effects.

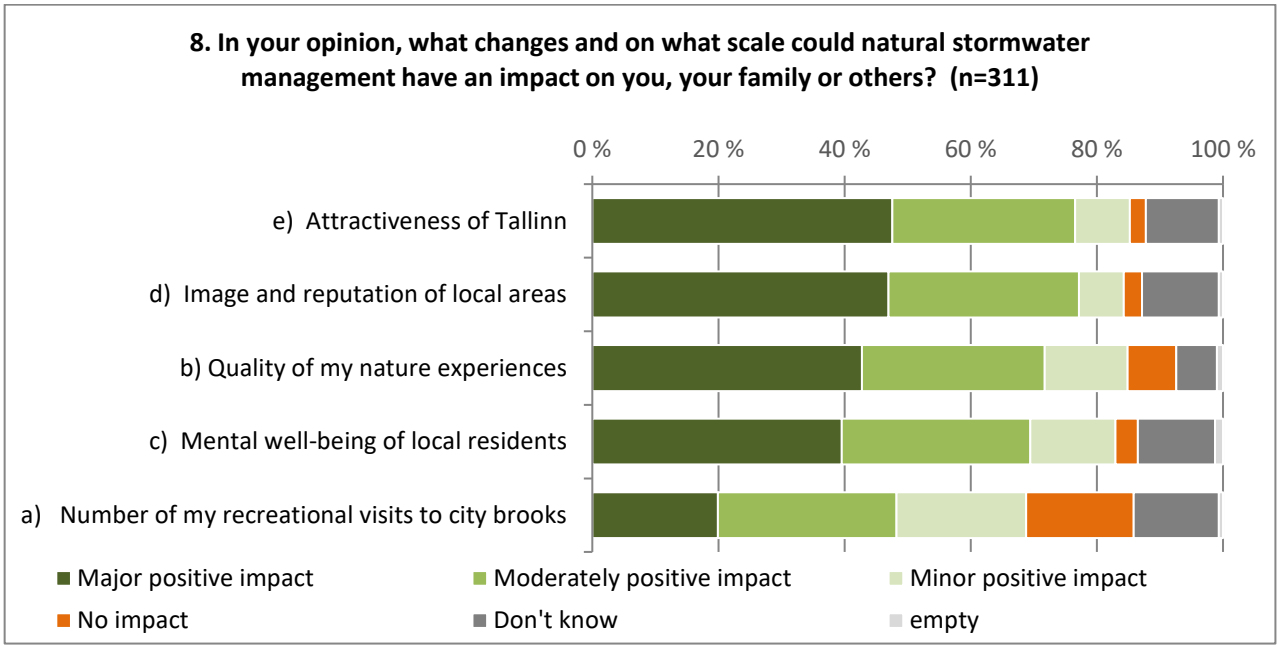


Figure 8. Opinions of respondents on the effects of sustainable stormwater management

3.3 Willingness to contribute

One of the most important purposes of the survey was to estimate the willingness of residents to pay a stormwater tax for more sustainable management of stormwater. Approximately 70% of all respondents would at least consider paying such tax in 2019–2028 to improve the condition of Tallinn's city streams and their surroundings (Figure 9).

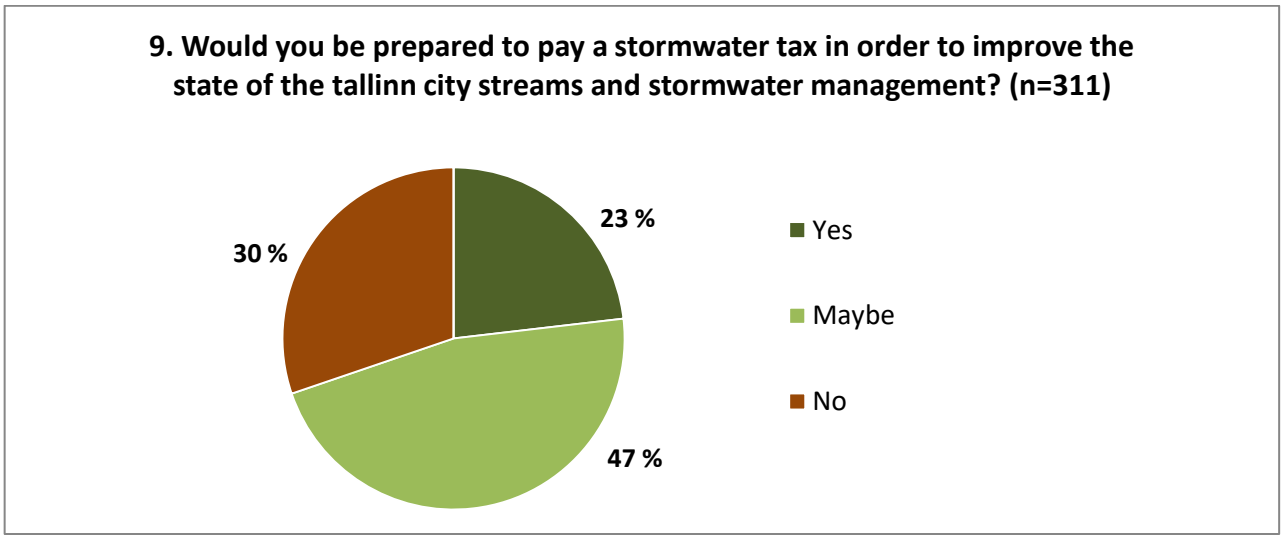


Figure 9. The willingness of respondents to pay for the improvement of urban water status

Those who replied "Yes" or "Maybe" to the willingness to pay question were then asked how certain they would be about paying different amounts each month.

Table 4 summarizes the estimated average sums that respondents would be willing to pay annually for the improved status of small waters in the Tallinn area. A total of 110 respondents were not willing to pay, i.e. their willingness to pay was assumed to be EUR 0. Based on the results, the respondents were on average willing to pay a stormwater tax of EUR 10.90–23.70 per year. Table 12 presents the average willingness to pay for Estonian and Russian native speakers separately. Out of interest, the average willingness to pay was also determined for different age groups (Figure

10). The lower and upper values of average willingness to pay were calculated in two different ways (Kristrom 1990; Turnbull 1976).

Table 4. Respondents' (n = 311) average annual willingness to pay per person (and standard deviation, €) for more sustainable management of stormwater.

Certainty expressed by respondents about paying the fee of their choice	Willingness to pay (WTP) [€/year/person]	
	Lower bound (Turnbull estimate)	Upper bound (Kriström estimate)
I would definitely pay	10.9 (20.0)	15.2 (17.8)
I would definitely or probably pay	17.3 (29.6)	23.7 (29.1)

Table 5. Mean annual willingness to pay (and standard deviation, €/person/year) in different language groups

Native language	Mean willingness to pay (WTP)		N, lower bound	N, upper bound
	Lower bound (Turnbull estimate)	Upper bound (Kriström estimate)		
Estonian	10.3 (15.1)	17.1 (33.2)	220	246
Russian	13.2 (32.0)	18.2 (36.1)	62	65

Factors related to the respondents or their attitudes that together contributed to the positive willingness to pay were analysed using a regression model. The model explained respondents' willingness to pay a positive monthly stormwater tax. Based on the results, the willingness to participate was increased by the following factors: whether the survey provided the respondent with new information on stormwater, the respondent's age (younger respondents were more willing to pay than older ones) and if the respondent lived in the Pirita area.

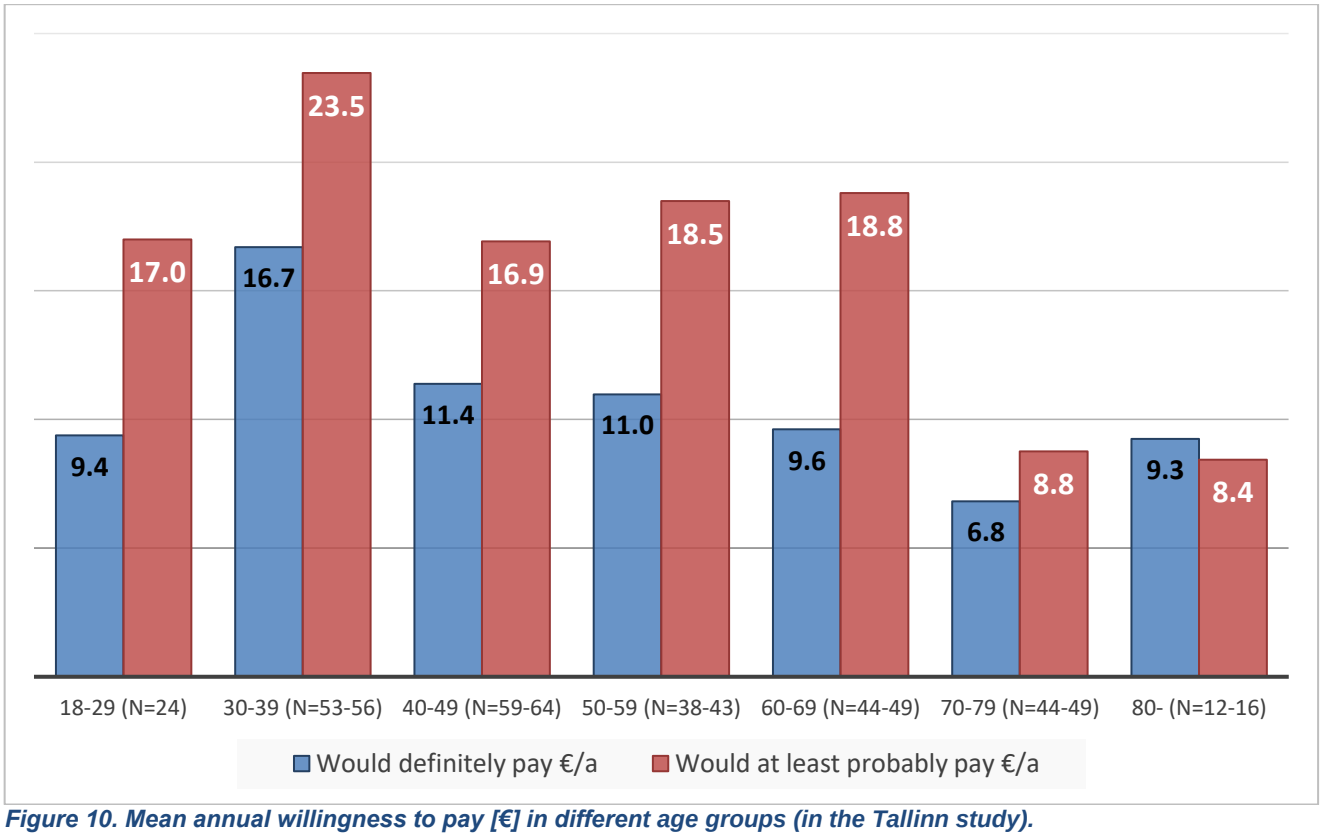


Figure 10. Mean annual willingness to pay [€] in different age groups (in the Tallinn study).

For those who were definitely or possibly willing to pay the most important reason for this was the fact that the respondent uses city streams for recreation (Figure 11). The next most important topic was the reduction of urban floods by sustainable approaches. Just over one-third of respondents willing to pay considered it very important that the city's stormwater system should be made more efficient because they wanted a greener cityscape or because the respondent felt that nutrients and other harmful substances should be prevented from entering urban streams. A quarter of respondents indicated that a very important reason for their willingness to pay was that city streams should be more visible in the cityscape.

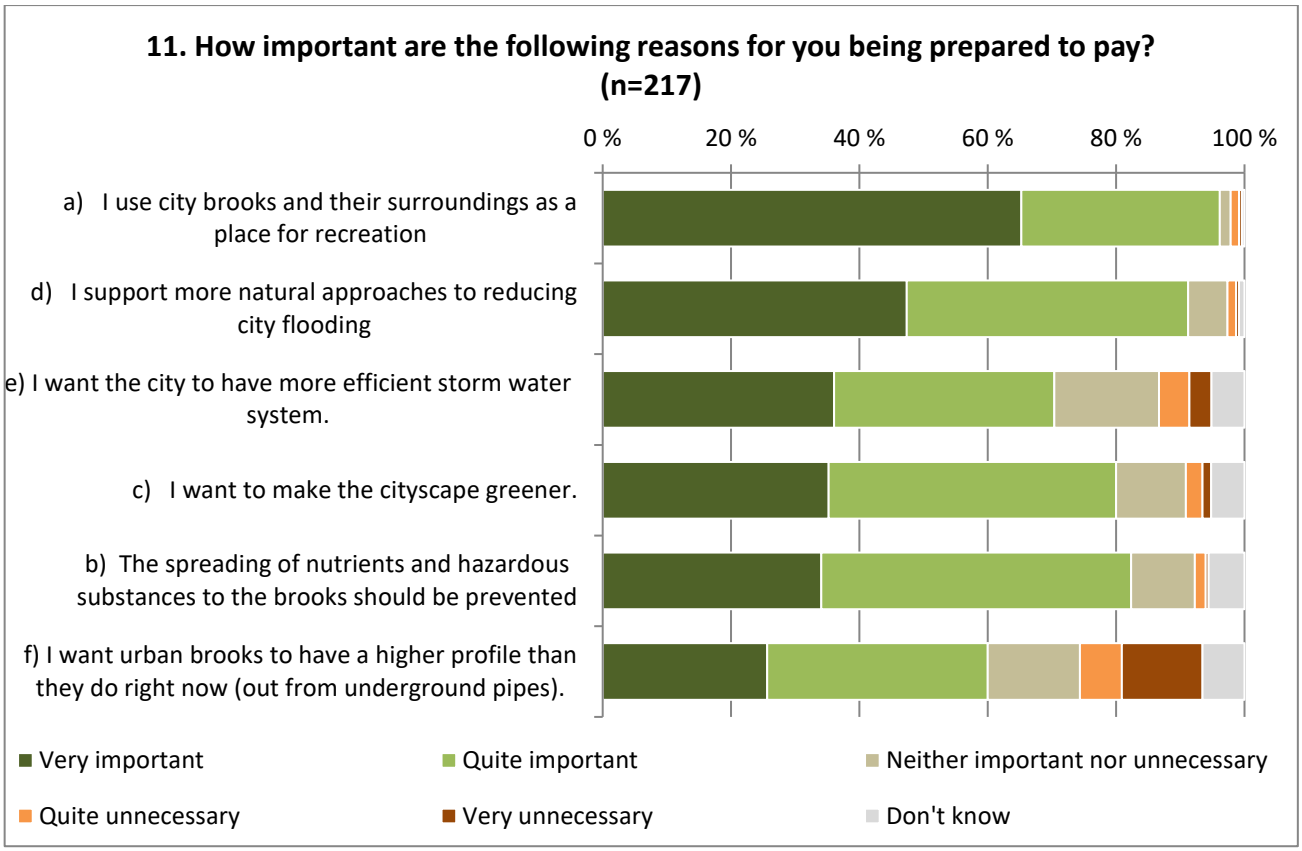


Figure 11. Reasons for willingness to pay.

For those who would not be willing to pay, the most important reason for this was that they felt that current taxes and mandatory payments should be directed more towards the management and protection of urban streams (Figure 12). About half said that they could not afford to pay a stormwater tax like the one presented. However, less than one-fifth of respondents unwilling to pay thought that small urban waters would not need protection.

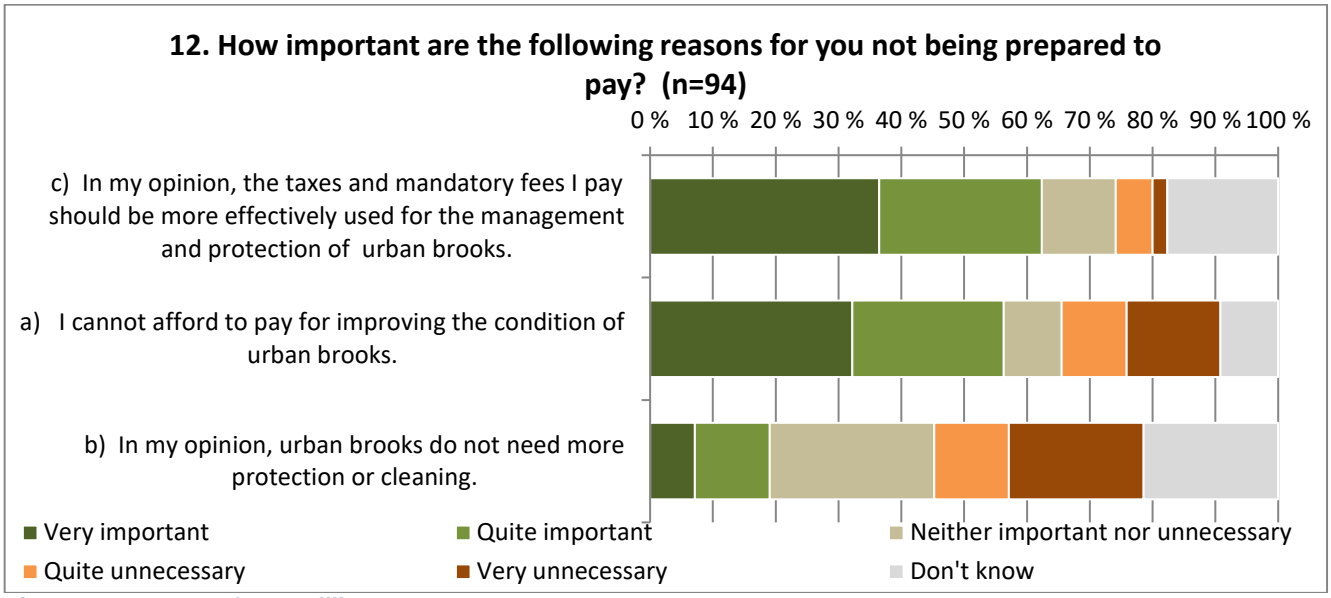


Figure 12. Reasons for unwillingness to pay.

3.4 Fundraising

Recipients were asked what would be the best way to raise money from citizens for more natural treatment of stormwater and for improving the condition of urban streams. The most popular method was to raise funds as part of the water or wastewater management fees (Figure 13). This approach was favored by more than two out of three of all respondents and even more by those willing to pay (77%). Compared to those not willing to pay, those who were willing to pay more often chose to pay as part of their water or wastewater charges. The popularity of voluntary payment was higher among non-contributors (44%) than among those who were willing to pay (18%). The least popular method was tax increase, which was considered the best practice by 1% of respondents, more by those willing to pay than non-paying.

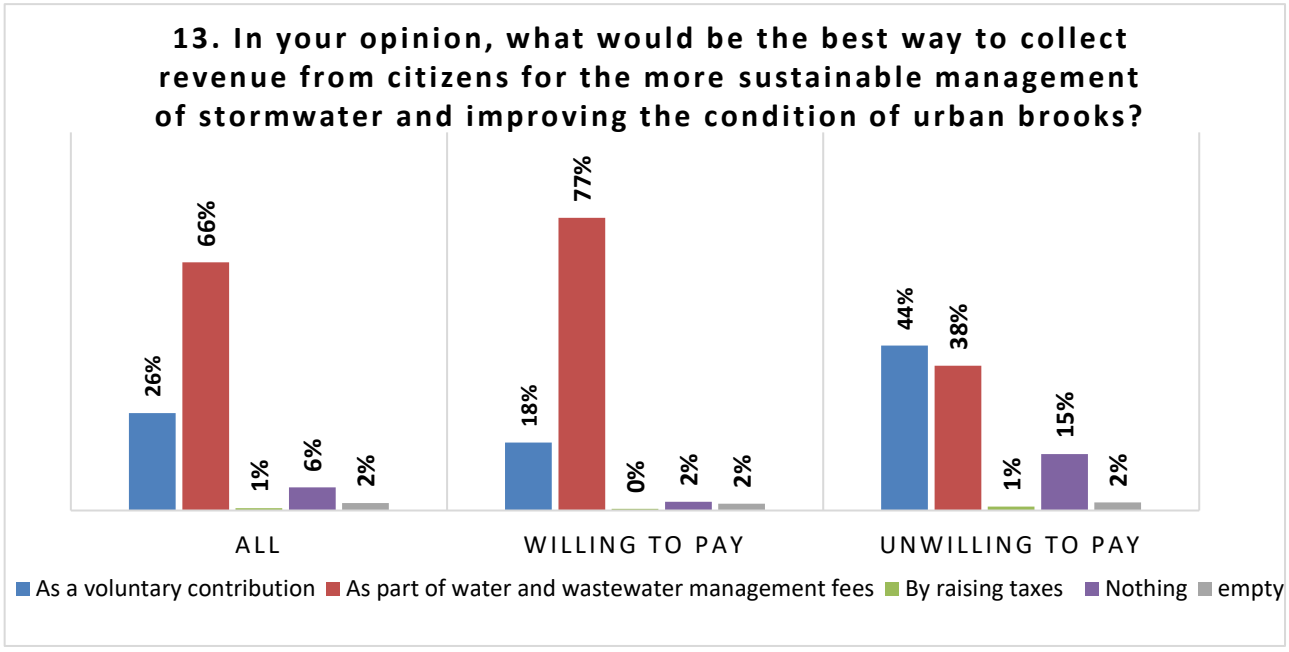


Figure 13. Preferred ways for raising funds for more sustainable treatment of stormwater and improving the condition of urban streams

The survey also sought to discover respondents' activity in dealing with city streams or stormwater measures. At the same time, it was important to remind respondents that small everyday actions can have an impact. Two out of three responded that they wash their cars in the carwash or using only environmentally friendly detergents when washing it in the yard. Almost 40% of respondents had participated in the Tallinn theme day “Let's do it!” And an equal number said that they had collected litter from streams and seashores (Figure 14).

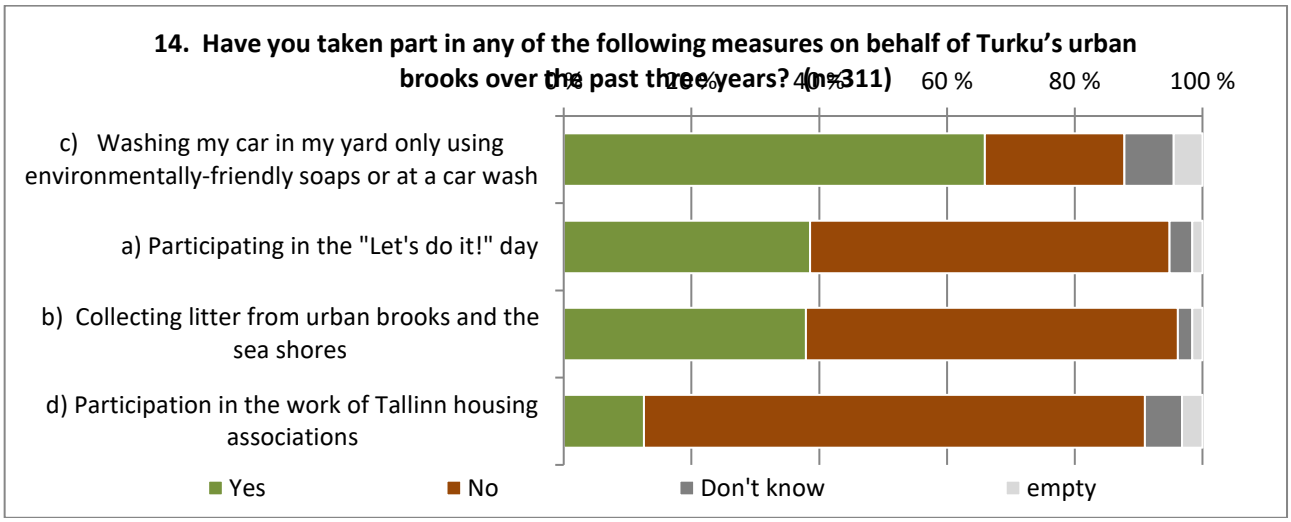


Figure 14. What actions have the respondents taken regarding urban waters?

As shown in Figure 15 almost 70% of respondents thought that collecting a stormwater tax would be a good idea. Even more received at least some new information on city streams through this survey. Almost as many also believed they would pay more attention to city streams' condition in the future. Nearly 85% were also more concerned about the state of the city streams after responding to the survey. About 80% of the respondents had also received at least some new information about stormwater through the survey. Nearly as many also felt it was important, at least to some extent, that the payment could be targeted to improve the condition of an individual city stream.

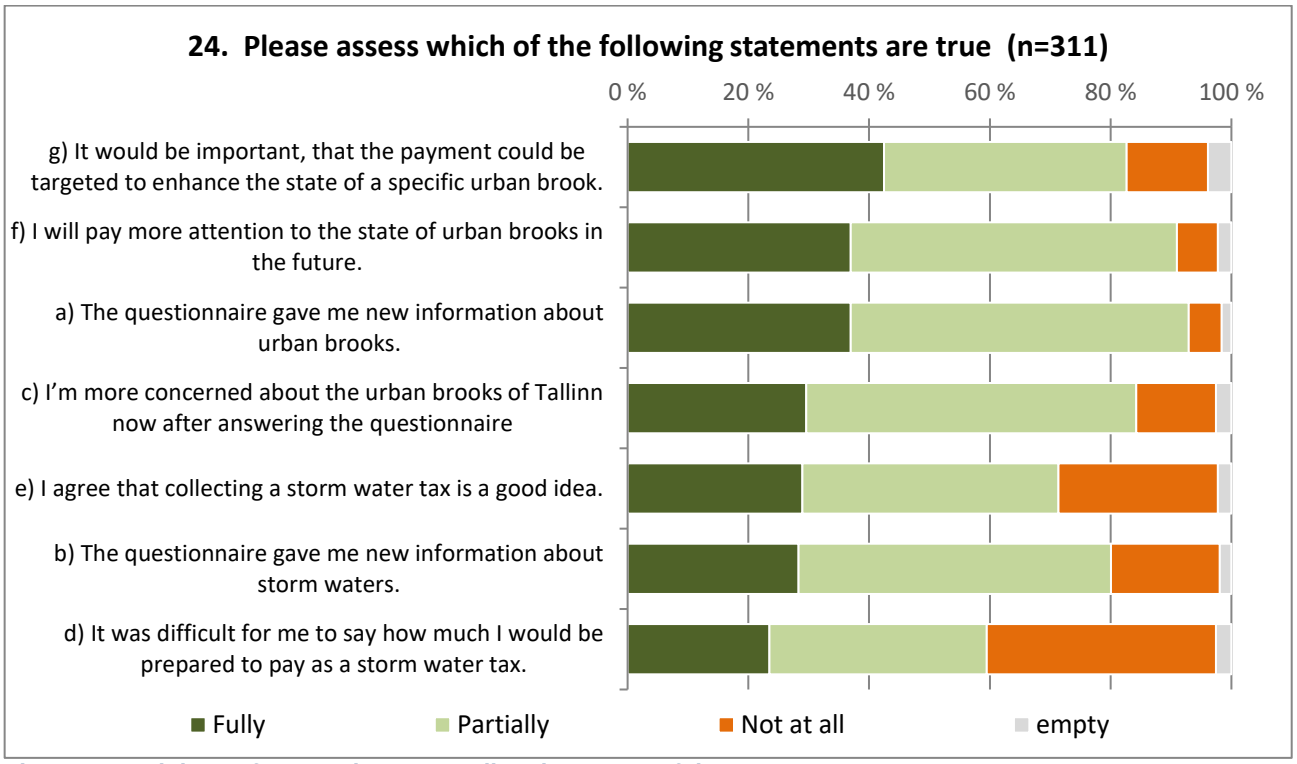


Figure 15. Opinions of respondents regarding the waters of the area.

4. Validity of the benefit data

About 58% of the respondents were women and the average age of the respondents was about 53 years. The share of Estonian speakers among the respondents was clearly higher than the share of native speakers of Russian. The survey questionnaires were only sent in Estonian, which most certainly explains the difference. Families with children accounted for about 39% of respondents, and only a small proportion of respondents (about 2%) reported being a member of an environmental organization (Table 6). A total of 38% of the respondents had a master's degree and 3% of the respondents had a doctoral degree. Most respondents (66%) lived in an apartment building, one in four in detached houses and less than a tenth in semi-detached or terraced houses. The average household income was asked as a categorical variable. Based on the responses, the median household income (gross) was about EUR 1,200 to EUR 1,799 per month in 2019. Responses were received from all three regions, as shown in Table 7.

Table 6. General information on the respondents

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Native language: Russian	20.9%
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Member of an environmental organization	2.3%

Table 7. Distribution of the respondents in the three sub-areas of the study.

Sub-area	Respondents	Percentage of the whole study area
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Total	311	100%

Table 8. Age groups of respondents

Age group (years)	Respondents	Percentage
18–29	24	9%
30–39	56	20%
40–49	64	23%
50–59	43	15%
60–69	49	18%
70–79	49	18%
80–93	18	6%
Total	279	100%

Before generalizing the results of the survey, it is necessary to assess how well the obtained survey data represent the studied population, i.e. in this case, the adult population and their opinions in the Haaberst, Pirita and Kristiine areas. To this end, a 2-page non-response survey was sent to a group of non-respondents (n = 400) in June 2020. However, for unknown reasons, only two responses were received, although the response rate in the Turku and Söderhamn non-response surveys was 10% and 20%, respectively. In general, only 100–200 non-response surveys had been sent, but as

it was now thought that the response rate could be lower than in previous surveys, an attempt was made to ensure that at least 10 responses would be achieved. Perhaps the COVID-19 pandemic at the time affected either the mailing of questionnaires or willingness to respond.

Therefore, other means were needed to assess the representativeness of the data. One of these was an analysis of whether the responses received differed according to the time taken to respond. For this, the data were divided into two groups based on whether the person responded before the first deadline or only after a reminder. Table 9 compares the average willingness to pay of these two groups. According to the results, the average willingness to pay was lower for those who responded later than among those who responded by the deadline. This may indicate that the data and the averages calculated from it are not fully generalizable to the whole population.

Table 9. Mean annual willingness to pay (and standard deviation, €/person/year) according to the rapidity of responding ("quicker" March 2020, "slower" April 2020).

Time of responding	Mean willingness to pay, €/person/year		N, lower bound	N, upper bound
	Lower bound (Turnbull estimate)	Upper bound (Kriström estimate)		
March 2020	14.2 (30.1)	21.8 (42.6)	82	88
April 2020	9.8 (17.3)	13.8 (33.3)	46	56

Next, representativeness was examined by comparing the sample data with the population for some general factors. The survey asked respondents for some sociodemographic information, which could be compared with similar data from the population (Haabersti, Pirita and Kristiine). The average age of the respondents was 53 years, which is close to the average age of the whole population (approximately 49 years). The proportion of female respondents was also about 58%, which is very close to the proportion of women (56%) in the whole study area. Comparing the distribution of respondents in different age groups with the age distribution of the population, the youngest age groups were under-represented in the survey data. However, this is a common result in many surveys. Correspondingly, the age group 70–79 years was slightly over-represented in the data. On the other hand, the share of families with children among the respondents was higher than in the population (39% vs. 24%). The average gross monthly salary of households in Tallinn (€1,545) in 2019 compares quite well with the average salary of the data, as the median salary range of the data was EUR 1,200–1,799 per month. The population data were obtained from the Estonian Ministry of the Interior (Population Register Tallinn Figures 2020).

This comparison between the data and the population variables indicates that the data were reasonably representative of the population under study and that the generalisation of the results to the Haaberst, Pirita and Kristiine areas is therefore possible and justified.

5. Environmental benefits

Based on the average willingness to pay, it is possible to assess the willingness of the entire adult population to pay in the Haabersti, Pirita and Kristiine residential areas of Tallinn. In 2020, about 80,000 people aged 18–79 lived in these areas. Generalisation of the willingness to pay results to the entire study area was carried out here in three ways: using the average willingness to pay calculated from the data in different language groups, residential areas and age groups.

The population of Tallinn consists of several different nationalities. Of its approximately 444,000 inhabitants, 52% are Estonians, 38% Russians and 10%, for example, Ukrainians, Belarusians and Finns. The share of Estonians is highest in the Nõmme, Pirita, Kristiine and city centre areas (Tallinn Development Plan 2014–2020). In this study, it was assumed that the proportions of the language groups presented above are, according to the sample, 60% Estonian and 40% Russian speakers. It is also known that of the total population in the three residential study areas, 47% live in the Haabersti, 33% in the Kristiine and 19% in the Pirita area, based on 2020 data. The age distribution of the population is presented in Table 10.

Table 10. Population and age distribution in the study area according to Tallinn arvudes Statistical Yearbook of Tallinn 2020

Age groups (y), Adults	Adults in Tallinn	%	Study area	%	Respondents	%
18–29	56,172	16	12,166	16	24	9
30–39	77,342	22	15,871	21	56	20
40–49	62,642	18	14,773	19	64	23
50–59	51 637	15	11,298	15	43	15
60–69	49,732	14	9,816	13	49	18
70–79	33,876	10	8,148	11	49	18
80–93	24,114	7	5,083	7	18	6
Total	**355,515**	**100**	**77,155**	**100**	**279**	**100**

The average willingness of residents to pay can be generalised to the study area under certain assumptions. Here, it was assumed that in 2020, about 80,000 residents aged 18–90 lived in the Haabersti, Kristiine and Pirita residential areas, and that about 52% of them were native Estonian speakers and 38% Russian speakers. The total willingness to pay for the change described by the study is about one million euros per year based on the results (see, for example, Tables 11 and 12). This assessment reflects the benefits to residents that would be achieved from more sustainable management of the city's stormwater each year in the future. The annual benefit is thus proportional to the size of the adult population. It is therefore to be expected that this benefit will increase in the future, as the population of Tallinn is growing steadily, and according to the Tallinn Development Plan (2014–2020), the population growth has been fastest in the Pirita city centre and Haabersti areas.

Table 11. Average willingness to pay used in calculating the total willingness to pay

Native language	Mean willingness to pay, €/year/person		N, lower bound	N, upper bound
	Lower bound (Turnbull estimate)	Upper bound (Kriström estimate)		
Estonian	10.3 (15.1)	17.1 (33.2)	220	246
Russian	13.2 (32.0)	18.2 (36.1)	62	65

Table 12 Total willingness to pay calculated based on the proportions of the language groups

Native language	Sample	%	Mean willingness to pay, €/year/person	
			Sample, 2,500	Population, 80,000*

Estonian	1,509	60	15,450	428,480	711,360
Russian	991	40	13,200	422,400	582,400
Total	**2,500**		**28,650**	**850,880**	**1,293,760**

**) The share of Estonian speakers is assumed to be 52% and that of Russian speakers 38%.*

5.1 Measures and total costs

The total costs of improving the status of small waters and stormwater management have not been estimated in Tallinn, so the available expert assessments and other plans and programmes were used for the cost assessment. An estimate of the total costs was needed to produce the light social cost–benefit analysis promised in the Heawater project. The cost estimate was made using four city streams. Because the uncertainties related to the number of restoration measures needed were very high, the analysis was also done in reverse, i.e. by estimating what could be the maximum total cost estimate for a restoration programme in the Haabersti, Kristiine and Pirita areas that would still be socially acceptable when considering the benefits over the next ten years.

5.1.1 Restoration measures and unit costs

The resident survey described the study area and the streams and rivers in it. According to the information received by the project researchers, the city of Tallinn does not currently have any practical plans for the restoration of small waters in the Pirita, Kristiine and Haabersti areas or for more sustainable stormwater management. However, for this study, we roughly assessed those urban streams for which it would seem most realistic to plan rehabilitation measures.

Restoration measures were considered for a total of four stream sections, namely Mustoja, Varsaallikas oja, Tiskre and Järveotsa oja (see Table 13 and Figure 2). Based on expert estimates, it would be possible to implement the measures described in Table 21 in these streams. For example, the state of the Mähe stream is considered to be quite natural, as its state has not been greatly affected by human activities. Experts therefore did not see the need to assume remediation measures for this stream for the next ten years.

Table 13. Urban streams for which it was possible to estimate restoration costs

Urban stream in the study area	Estimate of the length within the study area	Water basin*
Mustoja	1.3 km	11.3 km^2
Varsaallika oja	3.4 km	1.6 km^2
Tiskre oja	4.7 km	50 km^2
Järveotsa oja	4.9 km	4.1 km^2

*) Tallinna keskkonnaamet. Aastaraamat 2016

Estimates of the investment costs of individual restoration and management measures were obtained from employees of the City of Tallinn. The estimates also include cost estimates for the Tallinn restoration projects implemented in the Heawater project. The unit cost data presented in Table 14 thus allowed a rough estimate of the annual investment costs in relation to the change described in the survey scenario, i.e. the benefits.

Table 14. Urban water restoration measures with unit costs for those measures that would correspond to the scenario presented in the survey.

Measure	Unit of investment costs	Investment cost in euros	Potential brooks
River bank protection	m^2	100	Mustoja, Varsaallika oja
Removal of alluvial sediments	m^3	3,000	Mustoja, Varsaallika oja
Construction of spawning areas/rapids	10 km^2	9,000	Tiskre oja, Varsaallika oja, Järveotsa oja
Regaining of urban rivers	A section of 100 m	500,000	Mustoja
Construction of retention pools	1,500 m^3	300,000	Mustoja, Varsaallika oja

5.1.2 Combination of measures and total costs

A rough estimate was made of the extent of restoration measures needed for each of the four city streams, i.e. Mustoja, Varsaallika ditch, Tiskre and Järveotsa ditch, over the next ten years. No information was available on existing plans for the extent of measures. However, the costs of restoration measures implemented in Mustoja were assumed to a sufficient extent to also describe the costs of improving the state of Tiskreoja, Varsaallikka oja and Järveotsa oja. Estimates of the extent of measures and their costs are presented in Table 15.

In the case of Mustoja, it was estimated in this study that the restoration activities started in the Heawater project would be continued for a further 300 metres, i.e. erosion protection and alluvial sediment removal would be carried out there. In addition, it was estimated that an approximately 100-m portion of the now piped section of the stream would be brought to the surface and that one larger flood plain would be built in the catchment area of the stream. It was estimated that erosion protection and the removal of alluvial sediment would be implemented in the Varsaallikka stream, as well as the construction of two smaller flood plains and one fish spawning area. For Tiskre and Järveotsa oja, one spawning area was assumed for each.

In addition to these measures, it was assumed that floodplains would be built for a total of about ten kilometres of streams to equalize the flow of flood waters and stop solids. Measures to improve the landscape and recreational use were also assessed for a total of about ten stream kilometres. These last two measures would implement the objectives along the survey scenario to compensate for floods and improve recreational use and biodiversity in the stream surroundings. For these two measures, the cost estimate is based on the Helsinki Small Water Programme 2007 (Helsingin kaupungin rakennusvirasto 2007), which presents cost estimates for a number of measures planned for urban streams in the Helsinki area.

As shown in Table 15, the total cost of the measures described above is approximately EUR 3.5 million. The restoration activities are assumed here to be spread over the next ten years, with the total annual cost being around EUR 350,000.

Table 15. A rough estimate of the quantity and costs of possible urban stream restoration measures over the next ten years.

	Unit costs for investments (€)	Quantity	Total costs in 10 years (€)
Regaining of urban rivers (a 100-m section)	500,000	2	1,000,000
Construction of retention pools (ca. 1500 m^3)	300,000	3	900,000
Removal of alluvial sediments (m^3)	3,000	140	420,000
Construction of spawning areas/rapids	9,000	3	27,000
River bank protection (m^2)	100	4,000	400,000
Flood plains for 1 km	32,000	10	320,000
Improving the biodiversity and recreation potential of brooks and their surroundings for 1 km	4,000	10	40,000
Restoration projects executed in the Heawater project in Mustoja			369,455
Total			**€3,476,455**

5.2 Benefit–cost ratios

Residents of three residential areas in Tallinn were asked about the potential benefits and their willingness to pay for better stormwater management to enhance the state of the city's small waters. The resident survey served as an environmental valuation study and can be used to quantify the benefits of environmental change. Based on the results, the well-being of the residents of the Pirita, Haabersti and Kristiine residential areas would increase by about one million euros a year if the improvements presented in the survey were to take place. This environmental benefit can be compared to estimates of the total costs of the change required. In the previous section, a rough estimate of the total annual costs was made if the necessary measures were scheduled for the next ten years. Annual environmental benefits and total costs can be compared using a benefit–cost ratio. Based on estimates of the benefits and costs made for this study, the environmental benefits of more sustainable stormwater management would outweigh the costs in the Pirita, Haabersti and Kristiine residential areas if restoration measures were carried out in five or ten years. The benefit–cost ratios are presented in Table 16.

A conservative perspective was used when estimating the environmental benefits, i.e. the assessment was based on the lowest annual benefit assessment. The annual benefit remained the same regardless of the length of time for which the restoration measures would be implemented. Regarding the implementation of the measures, the calculation in Table 16 presents annual cost estimates for three, five and ten years.

Table 16. Benefit–cost ratios for more sustainable stormwater management in three residential areas in Tallinn based on studies of the Heawater project.

Annual total benefits and costs	Estimate in euros	Benefit–cost ratio
Annual total benefits	850,880	
Annual costs (with a time span of 3 years)	1,158,818	0.7
Annual costs (with a time span of 5 years)	695,291	1.2
Annual costs (with a time span of 10 years)	347,646	2.4

The benefit–cost ratio can also be considered in another way. For example, in the light of the total benefits, the extent or number of restoration measures in the study area that can be expected to be socially acceptable based on the environmental valuation study carried out can be assessed. Table 17 shows three fully imaginary, annual sets of measures that would be acceptable in terms of cost within the framework of achievable and conservatively assessed environmental benefits. The purpose of Table 17 is only to illustrate how different combinations of measures could be implemented so that the total cost estimate does not exceed the minimum annual benefit estimate, i.e. EUR 850,000.

Table 17. Three imaginary sets of measures that would be socially acceptable based on the results of a valuation study carried out in the Heawater project.

		Example A		***Example B***		***Example C***	
	Unit costs for investments	**Quantity**	***Total costs in euros***	**Quantity**	***Total costs in euros***	**Quantity**	***Total costs in euros***
Regaining of urban rivers (a 100-m section)	€500,000	**0**	*0*	**0**	*0*	**1**	*500,000*
Regaining of urban rivers (a 100-m section), cheaper option	€300,000	**1**	*300,000*	**0**	*0*	**0**	*0*
Construction of retention pools (ca. 1500 m^3)	€300,000	**0**	*0*	**0**	*0*	**1**	*300,000*
Construction of retention pools (ca. 500 m^3)	€100,000	**2**	*200,000*	**0**	*0*	**0**	*0*
Removal of alluvial sediments (m^3)	€3,000	**35**	*105,000*	**100**	*300,000*	**0**	*0*
Construction of spawning areas/rapids	€9,000	**8**	*72,000*	**2**	*18,000*	**1**	*9,000*
River bank protection (m^2)	€100	**1,000**	*100,000*	**3,000**	*300,000*	**0**	*0*
Flood plains for 1 km	€32,000	**2**	*64,000*	**6**	*192,000*	**1**	*32,000*
Improving the biodiversity and recreation potential of brooks and their surroundings for 1 km	€4,000	**2**	*8,000*	**10**	*40,000*	**2**	*8,000*
In total, €			**849,000**		**850,000**		**849,000**

6. Conclusion

According to the answers, extensive resident survey provided new information on streams and stormwater management to the residents of the Haaberst, Kristiine and Pirita districts. The extensive communication campaign on the Heawater project carried out in connection with the implementation of the survey also raised the issue more widely in Tallinn.

A large number of respondents were concerned about the state of the Baltic Sea and its protection was considered important. Many were also concerned about the state of the city streams. However, the study revealed that small waters are not very visible to the inhabitants of the districts and that they are also partly contradictory. Some respondents would like the small waters of their residential area to be part of the blue-green urban structure and some consider urban streams and ditches to be mainly repulsive sewers for wastewaters and other pollution. However, most respondents assumed that sustainable stormwater management could have major or moderate positive effects on Tallinn's attractiveness, image and reputation.

However, there were differences between the districts, for example respondents in the Pirita district were willing to contribute to improving the status and management of small waters with larger sums than those living in the Haaberst or Kristiine districts. Young people were also more willing to pay than older respondents. Another interesting result was that gaining new knowledge and learning also increased the willingness to participate.

The main reasons for respondents' willingness to pay were to reduce urban floods by natural means. Only a few of those who were unwilling to pay were reluctant to pay because they thought the city's small waters would not need protection. In general, many respondents believed that they would pay more attention to the state of urban streams in the future.

The effect of the Covid-19 pandemic may be reflected in response activity. When comparing the responses of this study to the corresponding studies of the Heawater project in Söderhamn in Sweden and Turku in Finland, it is good to keep this in mind.

Based on the light social cost-benefit analysis carried out, it would appear that the benefits would most likely clearly outweigh the costs of the measures. Of course, there are also many uncertainties associated with the estimates:

- how well the results of the survey on the perceived monetary benefits can be generalized to a wider range of respondents, when the response rate was 12% and the non-response analysis also did not provide certainty
- how well the cost estimates used reflect the final costs of the measures
- the extent to which the various measures should actually be taken in the region in order to achieve the desired results in terms of the state of the environment.

Despite these uncertainties, according to this study the benefits would outweigh the costs. The evaluation of the benefits was performed according to contingent valuation method which is scientifically valid and commonly used in cost-benefit analyzes. It was also possible to use real costs also of such measures implemented in the Heawater project, although the amounts of the measures had to be based more on assumptions.

The results of the study can be used as a starting point, for example, if a stormwater fee system or stormwater related programme or strategy were planned further. Mentions about stormwater catchment area specific solutions and protection and management plan for the Pirita catchment can be found, for example, in the Tallinn Action Plan for 2013–2020.

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Appendix 1. Tallinn questionnaire results

n=311

1. How important do you think it is that the following activities are paid for through taxes in Tallinn?	Very important	Quite important	Neither important nor unnecessary	Quite unnecessary	Very unnecessary	Don't know	empty
a) Promoting schoolchildren's access to recreational activities in after-school clubs	44%	37%	9%	3%	1%	5%	2%
b) Protection of the Baltic Sea	54%	34%	5%	1%	1%	3%	2%
c) Improving the city's cycling route network	40%	43%	9%	2%	1%	3%	2%
d) Improvement of highways	36%	48%	8%	3%	2%	3%	2%
e) Improving the water quality of city brooks ((e.g. Mustjõe, Mähe, Tiskre)	38%	43%	8%	3%	0%	5%	2%
f) Urban public transport development	41%	41%	10%	3%	1%	2%	1%

2. Do you live near any city streams (within 2 km)?	
Yes	67%
no	22%
Don't know	7%
Empty	4%

3. a) What is your opinion regarding the water quality of city brooks in the Tallinn area?	
Excellent	0%
Good	5%
Satisfactory	19%
Passable	43%
Poor	2%
Don't know	28%
empty	2%

4. In what way and how often have you made use of local watercourses/bodies in the City of Tallinn over the past 12 months?	Nearly every day	Nearly every week	Every month	Less frequently	Never	Don't know	empty
a) Spending time along the banks of brooks (ran, cycled, walked or grilled).	13%	18%	26%	23%	17%	1%	3%
b) Spending time by the lake (e.g. Harku, Raku, Männiku)	2%	5%	30%	31%	27%	1%	4%
c) Spending time on the shore or by the Baltic sea (boating, sailing etc.)	7%	13%	34%	38%	4%	1%	2%
d) Fishing in local waters	1%	2%	14%	8%	70%	2%	3%
e) I have spent time by the ponds of Tallinn parks (Kadrioru, Löwenruh)	3%	5%	42%	38%	8%	1%	3%
f) Other (specify):	5%	2%	4%	2%	1%	9%	77%

5. How much do you agree with the following claims?	Fully agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Fully disagree	Don't know	empty
a) I am concerned about the condition of the Baltic Sea	47%	32%	15%	1%	1%	3%	1%
b) Small rivers of Tallinn are important to me	34%	37%	20%	3%	1%	4%	1%
c) I am worried about the condition of all small watercourses within the city area	30%	46%	15%	5%	1%	3%	1%
d) City brooks should enjoy a higher profile in the cityscape	44%	35%	15%	1%	0%	4%	1%

6. Had you heard about stormwater before?	
Yes, I already knew about stormwater	54%
Yes in principle, but the descriptions and images above gave me some new information on the subject	38%
I had heard the term before, but did not really know what it meant	4%
No, I had no knowledge of stormwater	3%
Don't know	1%
empty	2%

7. How much do you agree with the following claims?							
	Fully agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Fully disagree	Don't know	empty
a) The living conditions for fish in Tallinn's city brooks must be improved	43%	34%	12%	4%	0%	4%	2%
b) Stormwater or its volume/ quality are not a problem in Tallinn.	2%	8%	21%	33%	26%	10%	0%
c) I believe that I can influence the condition of small watercourses through my own actions	10%	29%	26%	14%	6%	14%	1%
d) Untreated stormwater should not be led to small urban brooks.	41%	35%	14%	3%	1%	5%	1%
e) In my opinion, water quality in city brooks has improved in recent years	0%	8%	28%	11%	4%	48%	1%
f) In my opinion, city flooding has increased in Tallinn over the past ten years	7%	32%	22%	10%	1%	28%	1%

8. In your opinion, what changes and on what scale could natural stormwater management have an impact on you, your family or others?						
	Major positive impact	Moderately positive impact	Minor positive impact	No impact	Don't know	empty
a) Number of my recreational visits to city brooks	20%	28%	21%	17%	14%	1%
b) Quality of my nature experiences	43%	29%	13%	8%	6%	1%
c) Mental well-being of local residents	40%	30%	14%	4%	12%	1%
d) Image and reputation of local areas	47%	30%	7%	3%	12%	1%
e) Attractiveness of Tallinn	48%	29%	9%	3%	12%	1%

9. Would you be prepared to pay a stormwater tax in order to improve the state of the Tallinn city brooks and stormwater management?	
Yes	23%
Maybe	47%
No	30%
Empty	0%

10. How much would you be prepared to pay?						
	I would definitely pay	I would most likely pay	I'm not sure if I would pay	I would most likely not pay	I would definitely not pay	empty
0,25 €/month (6,00 €/a)	49%	7%	5%	1%	3%	35%
0,50 €/month (6,00 €/a)	41%	10%	5%	3%	5%	38%
1,00 €/month (12,00 €/a)	32%	10%	10%	5%	8%	35%
2,00 €/month (24,00 €/a)	16%	10%	13%	9%	13%	39%
4,00 €/month (48,00 €/a)	5%	7%	14%	14%	21%	39%
8,00 €/month (96,00 €/)	1%	4%	8%	16%	31%	40%
16,00 €/month (192,00 €/a)	0%	1%	6%	13%	41%	40%
More than 16 €/month	1%	1%	1%	6%	33%	58%

11. How important are the following reasons for you being prepared to pay?						
	Very important	Quite important	Neither important nor unnecessary	Quite unnecessary	Very unnecessary	Don't know
a) I use city brooks and their surroundings as a place for recreation	19%	25%	11%	5%	9%	5%
b) The spreading of nutrients and hazardous substances to the brooks should be prevented	49%	23%	1%	1%	0%	0%
c) I want to make the cityscape greener.	35%	32%	5%	1%	0%	1%
d) I support more natural approaches to reducing city flooding	26%	33%	8%	2%	1%	4%
e) I want the city to have more efficient stormwater system.	25%	36%	7%	1%	0%	4%
f) I want urban brooks to have a higher profile than they do right now (out from underground pipes).	27%	26%	12%	4%	3%	4%
g) Other reason (please specify):	5%	1%	1%	1%	0%	12%

12. How important are the following reasons for you not being prepared to pay?						
	Very important	Quite important	Neither important nor unnecessary	Quite unnecessary	Very unnecessary	Don't know
a) I cannot afford to pay for improving the condition of urban brooks.	13%	15%	8%	8%	10%	4%
b) In my opinion, urban brooks do not need more protection or cleaning.	4%	6%	10%	9%	15%	10%
c) In my opinion, the taxes and mandatory fees I pay should be more effectively used for the management and protection of urban brooks.	18%	25%	5%	3%	1%	6%
d) Other reason (please specify):	5%	1%	0%	0%	0%	6%

13. In your opinion, what would be the best way to collect revenue from citizens for the more sustainable management of stormwater and improving the condition of urban streams?	
As a voluntary contribution	26%
As part of water and wastewater management fees	66%
By raising taxes	1%
Nothing	6%
empty	2%

14. Have you taken part in any of the following measures or actions?				
	Yes	No	Don't know	empty
a) Participating in the "Let's do it!" day	39%	56%	4%	2%
b) Collecting litter from urban brooks and the sea shores	38%	58%	2%	2%
c) Washing my car in my yard only using environmentally-friendly soaps or at a car wash	66%	22%	8%	5%
d) Participation in the work of Tallinn housing associations	13%	78%	6%	3%
e) Other	11%	5%	11%	73%

15. Gender	
Female	58%
Male	39%
Other	3%
Empty	1%

16. Age	
Under 20 years	0%
20-29 years	7%
30-39 years	18%
40-49 years	20%
50-59 years	14%
60-69 years	16%
70-79 years	15%
80 years tai yli	6%
empty	4%

17. Families with chidren	
Families with children	39%
No children	61%
empty	2%

18. What type of residence do you live in?	
Detached house	25%
Semi-detached or terraced house	8%
Apartment building	66%
Other	0%
empty	1%

19. Postal code							
10100	1%	11400	0%	12600	1%	13500	32%
10600	15%	11900	8%	12900	0%	15300	0%
11200	0%	12000	9%	13100	0%		
11300	10%	12100	4%	13400	4%		

20. How long have you lived in Tallinn?	
Less than a year	0%
1- 4 years	2%
5-9 years	7%
10-19 years	12%
20-29 years	15%
30-39 years	11%
40-49 years	15%
50 years tai yli	35%
empty	2%

21. What is your highest level of education?	
Basic school education	1%
Secondary education	17%
Vocational qualification	9%
Applied higher education	13%
Bachelor's degree	15%
Master’s degree	36%
Doctorate	3%
Other	0%
empty	5%

22. Which of the following groups do you feel you belong to?	
Interested in water and nature through my occupation	15%
Interested in water and nature through my hobby(ies)	42%
Avid nature visitor (hunter, mushroom picker, berry picker, etc.)	55%
Other outdoor activities (cycling, running, etc.)	62%
Member of an environmental protection organisation or foundation	2%
Other	4%

23. What was your household's total pre-tax income per month for 2019?	
Less than 700€/month	15%
700-1199€/month	18%
1200-1799€/month	15%
1800-2399€/month	14%
2400-2999€/month	9%
3000-3999€/month	11%
4000-4999€/month	5%
5000-5999€/month	3%
More than 6000€	5%
empty	5%

24. Please assess which of the following statements are true.				
	Fully	Partially	Not at all	empty
a) The questionnaire gave me new information about urban brooks.	37%	56%	5%	2%
b) The questionnaire gave me new information about stormwaters.	28%	52%	18%	2%
c) I'm more concerned about the urban brooks of Tallinn now after answering the questionnaire	30%	55%	13%	3%
d) It was difficult for me to say how much I would be prepared to pay as a stormwater tax.	23%	36%	38%	3%
e) I agree that collecting a stormwater tax is a good idea.	29%	42%	26%	2%
f) I will pay more attention to the state of urban brooks in the future.	37%	54%	7%	2%
g) It would be important, that the payment could be targeted to enhance the state of a specific urban brook.	42%	40%	14%	4%

25.	
a) How interesting was the topic of the survey on a scale of 1-5?	3,9
b) What is your assessment of this questionnaire on a scale of 1-5?	3,9

Appendix 2. Questionnaire

Linnaelanike arvamus Tallinna linnajõgede seisundi kohta

2500 elanikule
mõeldud küsimustik

Tallinn SYKE heaWater PIDÄ LÄHIVEDET KUNNOSSA Interreg Central Baltic EUROPEAN UNION European Regional Development Fund

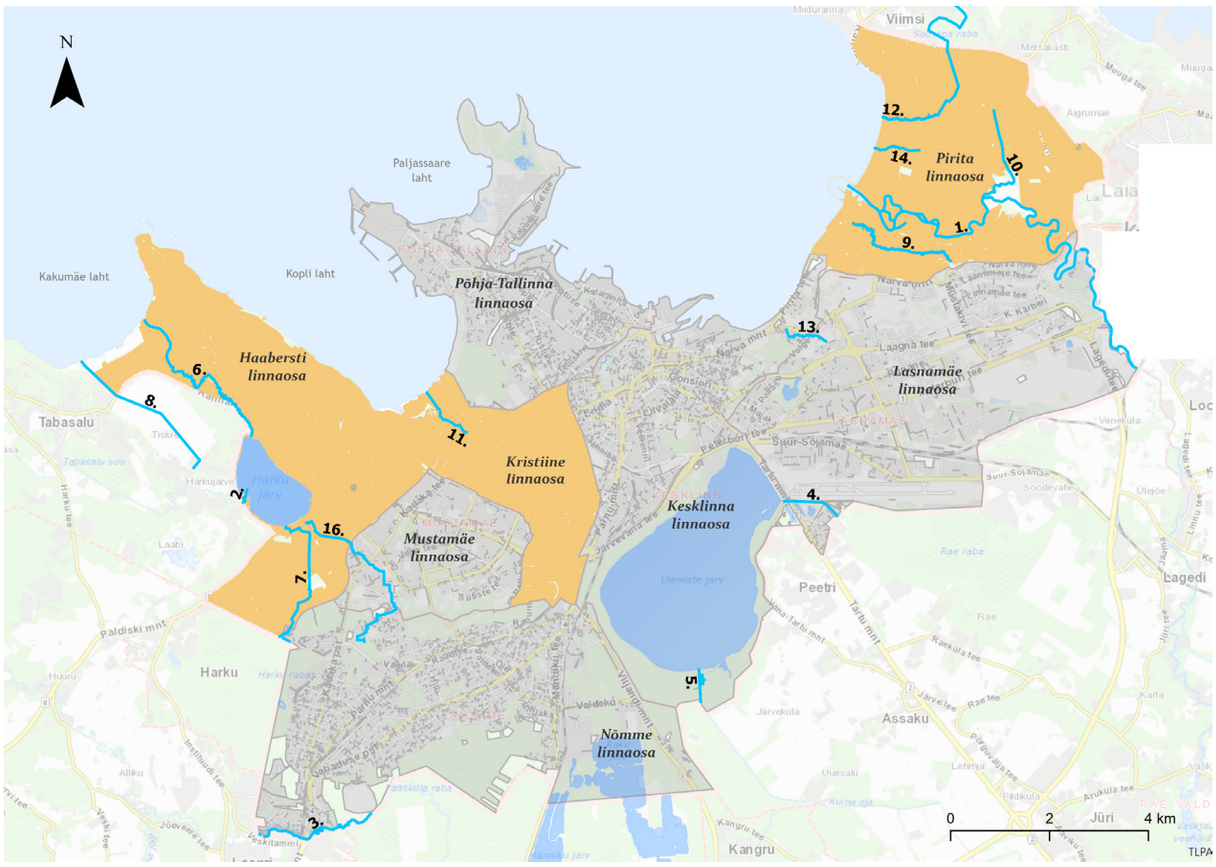
Oleme huvitatud Teie arvamusest Tallinna linna väikeste jõgede seisundi kohta ja suhtumisest neisse. Küsimustel ei ole õigeid ega valesid vastuseid ja Teie nime ei seostata ühegi vastusega. Vastused on konfidentsiaalsed.

1 Kui oluline on Teie arvates rahastada järgmisi tegevusi Tallinnas juhul kui linna eelarve oleks osaliselt kodanikke kaasav?

▶*Märkige igal real ainult üks vastus.*

	Väga oluline	Üsna oluline	Ei oluline ega ebaoluline	Üsna ebaoluline	Ei ole üldse oluline	Ei tea
a) Koolilastele koolivälise huvitegevuse kättesaadavuse parandamine	☐	☐	☐	☐	☐	☐
b) Läänemere kaitsmine	☐	☐	☐	☐	☐	☐
c) Linna jalgrattateede võrgustiku arendamine	☐	☐	☐	☐	☐	☐
d) Linna sõiduteede hoolduse tõhustamine	☐	☐	☐	☐	☐	☐
e) Väikeste linnajõgede (nt Mustjõe, Mähe, Tiskre) veekvaliteedi parandamine	☐	☐	☐	☐	☐	☐
f) Linna ühistranspordi arendamine	☐	☐	☐	☐	☐	☐

Allpool on Tallinna jõgede kaart. Kaardil on uurimispiirkond kollasega esile tõstetud. Küsitlus viiakse läbi kolmes Tallinna linnaosas – Haabersti, Kristiine ja Pirita.



©Tallinna linn.

TALLINNA LINNAJÕED

Tallinna linnas oli varem tihedam jõgede võrgustik. Nüüdseks voolavad paljud jõed maa-alustes torudes. Tallinnas on kokku 16 linnajõge. Linnajõgede all mõistame käesolevas küsitluses nii loodusliku sängiga (jõed ja ojad) kui ka tehissängiga vooluveekogusid (kraav, peakraav, kanal). Vaata tabel ja kaart. Pikim neist on Pirita jõgi (üle 100 km). Enamik Tallinna jõgesid on väikesed jõed, mille pikkus on vähem kui 10 km. Kui minevikus kasutati linnajõgesid sageli reovee ärajuhtimiseks, siis tänapäeval suunatakse neisse sademevesi. Sademevee juhtimine jõgedesse on laiendanud paljude linnajõgede valgala, muutnud nende vooluhulka, veetaset ja vee kvaliteeti.

Veekogu	Pikkus, km
1. Pirita jõgi	113,1
2. Harku oja	15,7
3. Pääsküla jõgi	12,7
4. Vaskjala-Ülemiste kanal	10,8
5. Kurna oja	10,8
6. Tiskre oja	4,7
7. Järveotsa oja	4,1
8. Apametsa peakraav	3,4
9. Varsaallika oja	3,4
10. Lepiku kraav	2,7
11. Mustjõe oja (Mustoja)	1,3
12. Mähe oja	1,6
13. Hundikuristiku oja	1,4
14. Teesuuoja	1,0
15. Väo kraav	0,6
16. Iisaku oja	0,2

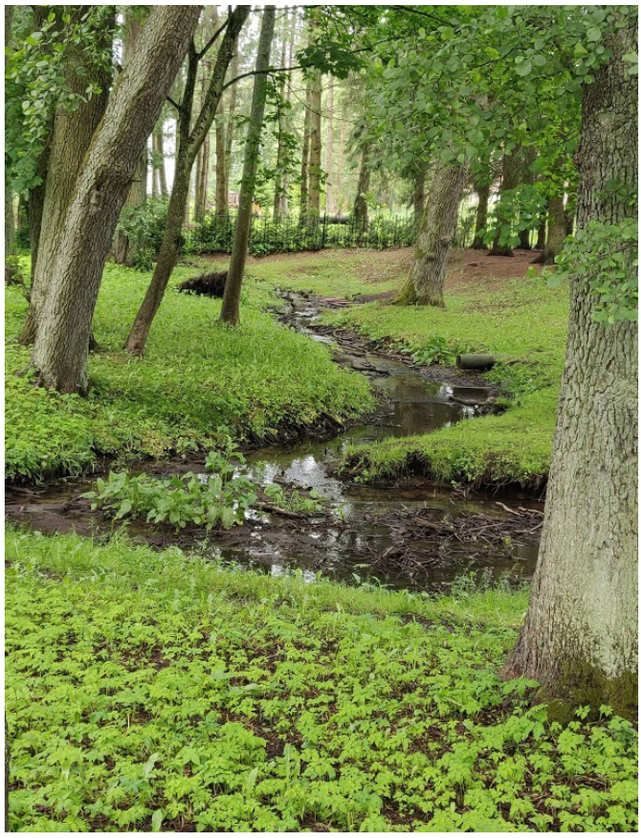


Photo: Mähe oja. ©Tallinna linn.

2 Kas Te elate mõne väikse linnajõe lähedal (2 km raadiuses)?

☐ Ei
☐ Ei tea

☐ Jah. Kui teate jõe nime, märkige see siia: _____

_____

_____

3 a) Milliseks peate Tallinna väikeste linnajõgede vee kvaliteeti?

▶ *Valige ainult üks vastus.*

☐ Suurepärane ☐ Hea ☐ Rahuldav ☐ Halb ☐ Väga halb ☐ Ei tea

b) Palun täpsustage, miks Te nii arvate: _____

_____

_____

4 Milline ja kui sage on viimase 12 kuu jooksul Teie kokkupuude Tallinna veekogudega?

▶*Märkige igal real ainult üks vastus.*

	Peaaegu iga päev	Peaaegu iga nädal	Iga kuu	Harvemini	Mitte kunagi	Ei tea
a) Olen veetnud aega väikese linnajõe ääres (jooksnud, rattaga sõitnud, jalutanud või grillinud).	☐	☐	☐	☐	☐	☐
b) Olen veetnud aega järve ääres (nt. Harku, Raku, Männiku).	☐	☐	☐	☐	☐	☐
c) Olen veetnud aega mere ääres või sõitnud Läänemerel paadi, purjeka vms.	☐	☐	☐	☐	☐	☐
d) Olen käinud kalal.	☐	☐	☐	☐	☐	☐
e) Olen veetnud aega Tallinna parkide tiikide ääres (Kadrioru, Löwenruh)	☐	☐	☐	☐	☐	☐
f) Muu (palun täpsustage):_____	☐	☐	☐	☐	☐	☐

5 Mil määral nõustute järgmiste väidetega?

▶*Märkige igal real ainult üks vastus.*

	Nõustun täielikult	Nõustun suurel määral	Ei nõustu ega vaidle ka vastu	Ei nõustu eriti	Ei nõustu üldse	Ei tea
a) Olen mures Läänemere seisundi pärast.	☐	☐	☐	☐	☐	☐
b) Tallinna väikesed jõed on mulle olulised.	☐	☐	☐	☐	☐	☐
c) Olen mures kõikide Tallinnas asuvate järvede ja jõgede seisundi pärast.	☐	☐	☐	☐	☐	☐
d) Väikesed linnajõed peaksid linnapildis olema nähtavamad.	☐	☐	☐	☐	☐	☐

TALLINNA VÄIKESTE JÕGEDE SEISUNDIST

Seireandmete põhjal on Mustjõe ja Tiskre oja veekvaliteet kesine. Tiskre oja saab alguse Harku järvest. Mustjõe vee kvaliteeti mõjutab tänavatelt, tööstusaladelt ja ehitusobjektidelt pärinev sademevesi.

Mähe oja veekvaliteedi seiret alustati 2019. aastal. Esialgsete seireandmete kohaselt on sellegi väikese oja veekvaliteet kesine. Kõigisse neisse väikestesse ojadesse suunatakse sademevett.

Foto: Mustjõe oja ©Tallinna linn

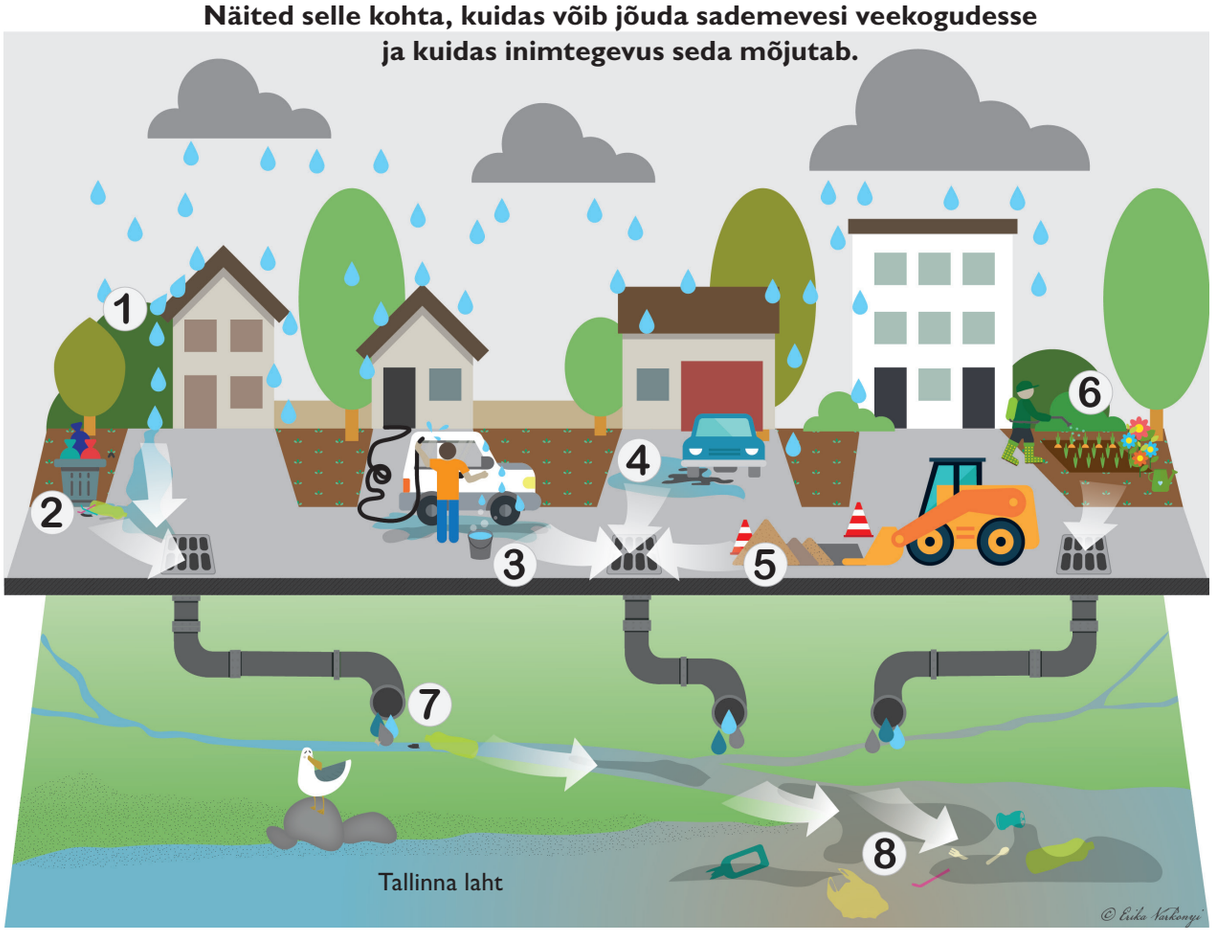
MIS ON SADEMEVESI?

Sademevesi on sademetena langenud ning ehitiste, sealhulgas kraavide kaudu kogutav ja ärajuhitav vesi. Üldjuhul juhitakse tänavatelt kogutud vesi töötlemata kujul jõgedesse või merre. Sademevesi sisaldab ka aineid, mis kogunevad veekogudesse ja põhjustavad nende eutrofeerumist ehk vetikate vohamist. Kõvakattega maapindade osakaal linnas ilmselt suureneb veelgi, mistõttu jõuab sademeveesüsteemi ka suurem kogus vett.

Prognoositakse, et kliimamuutuste mõjul kasvab talvine sademehulk ja sagenevad suvised valingvihmad. Sademevee hulga suurenemisega kaasnevad omakorda üleujutused ja veekvaliteedi probleemid.

Praegu rahastab linn sademeveesüsteemi hooldust linna eelarvest. Käesoleval hetkel ei ole üheselt määratud sademeveesüsteemide (kraavide, truupide) ning liigniiskete alade hoolduse korraldamine, vajades õiguslikult reguleerimist ning lisaks ka sademeveerajatiste hoolduseks vahendite eraldamise küsimuse lahendamist. Riiklikul tasandil ei ole välja töötatud sademevee teenuse tasu arvestuse korda, mistõttu on linn teinud riigile ettepaneku ÜVK seaduse muutmiseks, et täpsustada õigusi ja kohustusi sademeveesüsteemide korrastamiseks ja sademevee teenuse tasu aluste kehtestamiseks.

Näited selle kohta, kuidas võib jõuda sademevesi veekogudesse ja kuidas inimtegevus seda mõjutab.



1. Katustelt ja tänavatelt satub sademevette raskmetalle ja muid ohtlikke aineid.
2. Prügikasti sisu võib sademevette sattuda ja vesi kannab prügi edasi.
3. Autopesuvesi satub eramute õuelt vooluveekokku ja see võib olla ohtlik elusorganismidele.
4. Halvasti hooldatud sõidukist võib sademevette jõuda õli või muid aineid.
5. Sademevesi kannab edasi ehitusplatsilt pärit mulda ja liiva.
6. Taimekaitsevahendid ja liigsed toitained kanduvad sademeveega hõlpsalt vooluveekokku.
7. Linna tänavatelt pärit sademevesi satub tavaliselt ojadesse ja jõgedesse puhastamata kujul.
8. Ojad ja jõed kannavad prügi ja ohtlikke aineid ka järvedesse ja merre.

6 Kas olete varem kuulnud sademeveest?

▶*Valige ainult üks vastus.*

☐ Jah, ma olin sademeveest juba teadlik.
☐ Jah, põhimõtteliselt küll, aga sain eespool toodud kirjeldustest ja piltidest selle teema kohta uut teavet.
☐ Ma olin seda sõna kuulnud, kuid ei tea tegelikult, mida see tähendab.
☐ Ei, ma ei teadnud sademeveest midagi.
☐ Ei tea

KUIDAS SAAB SADEMEVETT KÄIDELDA?

Üks sademevee käitlemise viis on vältida selle kogunemist ja võimaldada sellel maapinda imbuda. See tähendab, et linnaruumis on soovitatav kõvakatte, näiteks asfaldi asemel kasutada muru-, liiva- või kruusapinda. Samuti aitavad sademevee kogust vähendada haljaskatused.

Teine hea võimalus on juhtida sademevett torude asemel avatud kraave mööda. See aitab vähendada üleujutuse ohtu ja suurendab bioloogilist mitmekesisust, tagades vee-elustikule elupaigad. Veevoolu aeglustamiseks kasutatakse mitmesuguseid looduslikke sademevee kinnihoidmise meetodeid, nagu märgalad ja vihmapeenrad.

Iga kinnistu valdaja peab kohtkäitlema sademevett oma kinnistul. Eramajade omanikud saavad sademevett koguda, et tiike-basseine täita või aeda kasta ning nii oma veetarbimist linna veevõrgust vähendada.

Foto. Üleujutus Tallinna linnas. ©Tallinna linn.

Foto. Pilkupüüdva haljastusega vihmapeenar immutab sõiduteelt sinna valguva sademevee Turu linnas. ©Turu linn.

7 Mil määral nõustute järgmiste väidetega?

▶*Märkige igal real ainult üks vastus.*

	Nõustun täielikult	Nõustun suurel määral	Ei nõustu ega vaidle ka vastu	Ei nõustu eriti	Ei nõustu üldse	Ei tea
a) Kalade elupaiga kvaliteedi parandamine linnajõgedes on tähtis.	☐	☐	☐	☐	☐	☐
b) Sademevesi, selle hulk või kvaliteet ei ole Tallinnas probleem.	☐	☐	☐	☐	☐	☐
c) Saan väikeste linnajõgede seisundit oma tegevusega mõjutada.	☐	☐	☐	☐	☐	☐
d) Puhastamata sademevett ei tohi juhtida väikestesse linnajõgedesse.	☐	☐	☐	☐	☐	☐
e) Väikeste linnajõgede vee kvaliteet on viimastel aastatel paranenud.	☐	☐	☐	☐	☐	☐
f) Tallinnas on üleujutuste arv viimase kümne aasta jooksul suurenenud.	☐	☐	☐	☐	☐	☐

SADEMEVEE LOODUSLÄHEDASE KÄITLEMISE EELISED

Tavapäraselt juhitakse sademevesi sademeveesüsteemi kaudu reoveepuhastisse või lähimasse veekogusse. Valingvihma korral võib veehulk olla nii suur, et kanalisatsioon ei võta seda vastu ja tekib üleujutus.

Sademevee looduslähedasema käitlemise puhul aitavad sellised rajatised nagu märgalad, vihmapeenrad ja haljaskatused vett kinni hoida ja veetaimede abil seda puhastada. Looklev ja veetaimestiku rikas jõgi muudab linnapildi meeldivamaks ja mitmekesisemaks.

Sademevee tavapärane käitlemine.

Sademevee looduslähedane käitlemine.

8 Millisel määral võib sademevee looduslähedane käitlemine mõju avaldada?

▶*Märkige igal real ainult üks vastus.*

	Mõju puudub	Väike positiivne mõju	Keskmine positiivne mõju	Suur positiivne mõju	Ei tea
a) Minu külastuste arv linnajõgede äärde vabal ajal	☐	☐	☐	☐	☐
b) Minu looduselamuste kvaliteet	☐	☐	☐	☐	☐
c) Linnaelanike vaimne heaolu	☐	☐	☐	☐	☐
d) Linnaosade kuvand ja maine	☐	☐	☐	☐	☐
e) Tallinna linna atraktiivsus	☐	☐	☐	☐	☐

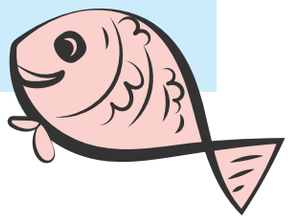
VAJA ON LISARAHASTAMIST

Selleks, et parandada Tallinna väikeste linnajõgede seisundit ja juurutada sademevee looduslähedasemat käitlemist, on vaja lisaraha. Üks lisaraha saamise võimalus oleks kehtestada sademeveemaks.

Sademeveemaksuna kogutud raha oleks võimalik kasutada nii linnaveekogude seisundi parandamiseks kui ka sademeveelahenduste arendamiseks ja looduslikumate lahenduste kasutuselevõtuks. Lisaks saaks maksu toel rakendada abinõusid, mis suurendaksid linnajõgede bioloogilist mitmekesisust.

Tõenäoliselt leiavad pärast looduslähedaste abinõude rakendamist Tallinna väikeste linnajõgede puhul aset allpool kirjeldatud muutused.

- ✦ Kogumis- ja immutussüsteemid (mahuti, tiik, lodu) tagavad selle, et üleujutuste kahjud vähenevad.
- ✦ Vast valminud elurajoonidest suunatakse sademevesi läbi märgalade linnajõgedesse ja -järvedesse.
- ✦ Jõgede äärde ehitatakse terrassid ning paigutatakse pingid ja prügikastid, et inimesed saaksid jalutada ja loodust nautida.
- ✦ Jõgi ja selle ümbrus tagavad mitmekesisema elupaiga paljudele linnu-, looma- ja putukaliikidele.
- ✦ Linnajõgedes suureneb kalade hulk.
- ✦ Maa-alused jõed on linnakeskkonnas osaliselt nähtavad.



9 Kas oleksite valmis maksma sademeveemaksu, et parandada Tallinna väikeste linnajõgede seisundit ja sademevee käitlemist?

☐ Jah ☐ Võib-olla ☐ Ei ▶*Jätkake vastamist 12. küsimusest alates*

10 Kui palju oleksite nõus maksma sademeveesüsteemi arendamise, sealhulgas linnajõgede seisundi parandamise eest?

▶*Iga summa kohta märkige, kui palju oleksite nõus maksma või mitte maksma.*
Arvestage vastamisel asjaolu, et kasutatav raha oleks teie kõikidest muudest kuludest eraldi.

Kuutasu	Maksaksin kindlasti	Maksaksin tõenäoliselt	Ma ei ole kindel, kas maksaksin	Tõenäoliselt ei maksaks	Ei maksaks kindlasti
25 senti kuus **(3 eurot aastas)**	☐	☐	☐	☐	☐
50 senti kuus **(6 eurot aastas)**	☐	☐	☐	☐	☐
1 euro kuus **(12 eurot aastas)**	☐	☐	☐	☐	☐
2 eurot kuus **(24 eurot aastas)**	☐	☐	☐	☐	☐
4 eurot kuus **(48 eurot aastas)**	☐	☐	☐	☐	☐
8 eurot kuus **(96 eurot aastas)**	☐	☐	☐	☐	☐
16 eurot kuus **(192 eurot aastas)**	☐	☐	☐	☐	☐
Üle 16 euro kuus. Kui jah, siis mitu eurot oleksite nõus kuus maksma? _____	☐	☐	☐	☐	☐

11 Mis ajendaks Teid sademeveemaksu maksma?

▶Märkige igal real ainult üks vastus. Pärast käesolevale küsimusele vastamist saate liikuda otse 13. küsimuse juurde.

	Väga oluline	Üsna oluline	Ei oluline ega ebaoluline	Üsna ebaoluline	Ei ole üldse oluline	Ei tea
a) Ma elan väikese linnajõe lähedal või käin selle ümbruses vaba aega veetmas.	☐	☐	☐	☐	☐	☐
b) Toitainete ja ohtlike ainete sattumist jõgedesse tuleb vältida.	☐	☐	☐	☐	☐	☐
c) Ma soovin muuta linnapilti rohelisemaks.	☐	☐	☐	☐	☐	☐
d) Ma toetan looduslikumaid lähenemisviise linnas üleujutuste vähendamiseks.	☐	☐	☐	☐	☐	☐
e) Ma soovin, et linnas oleks tõhusam sademeveesüsteem.	☐	☐	☐	☐	☐	☐
f) Ma soovin, et linnajõed oleksid praegusest rohkem nähtaval (maa alt väljas).	☐	☐	☐	☐	☐	☐
g) Muu põhjus (palun täpsustage): _____	☐	☐	☐	☐	☐	☐

Foto: Väike osa maa all voolavast Härjapea jõest, mis on linnapildis nähtav © Tallinna linn

12 Põhjused, miks inimesed ei ole valmis maksma linnajõgede seisundi parandamise või säilitamise eest, võivad olla väga erinevad. Millisel määral mõjutavad Teid allnimetatud asjaolud?

▶*Märkige igal real ainult üks vastus.*

	Väga oluline	Üsna oluline	Ei oluline ega ebaoluline	Üsna ebaoluline	Ei ole üldse oluline	Ei tea
a) Ma ei saa linnajõgede seisundi parandamist toetada rahalistel põhjustel.	☐	☐	☐	☐	☐	☐
b) Minu arvates ei vaja linnajõed lisakaitset ega -hooldust.	☐	☐	☐	☐	☐	☐
c) Minu arvates tuleks minu makstavaid makse kasutada linnajõgede hooldamise ja kaitse eesmärgil senisest tõhusamalt.	☐	☐	☐	☐	☐	☐
d) Muu põhjus (palun täpsustage): _____	☐	☐	☐	☐	☐	☐

13 Milline oleks Teie arvates parim viis, et koguda linnaelanikelt sademevee looduslähedasemaks käitlemiseks ja väikeste linnajõgede seisundi parandamiseks rahalist toetust?

▶*Valige ainult üks vastus.*

☐ Vabatahtliku panusena

☐ Osana vee ja reovee käitlemisega seotud maksudest

☐ Maksude tõstmisega

☐ Mitte midagi

14 Kas olete viimase kolme aasta jooksul panustanud Eesti kodanikuühiskonda järgmiste tegevuste kaudu?

▶*Märkige igal real ainult üks vastus*

	Jah	Ei	Ei tea
a) Osalemine talgupäeval „Teeme ära!“	☐	☐	☐
b) Linnajõgedest ja merekaldalt prügi korjamine	☐	☐	☐
c) Oma koduhoovis auto pesemine üksnes keskkonnasäästlike vahenditega või auto pesemine pesulas	☐	☐	☐
d) Osalemine Tallinna asumiseltside töös	☐	☐	☐
e) Muu (palun täpsustage): _____	☐	☐	☐

Vajame igalt vastajalt taustteavet, et saaksime kirjeldada tüüpilise linnaelaniku hoiakuid. ***Teie antav teave on konfidentsiaalne.***

Seega, palume Teil vastata järgmistele küsimustele, et saaksime Teie vastuseid uurimistöös analüüsida.

15 Sugu

☐ Naine ☐ Mees ☐ Ei soovi vastata

16 Sünniaasta _____

17 Leibkonna praegune suurus, sealhulgas Teie ise _____ täiskasvanud ja _____ lapsed

18 Millist tüüpi elamus Te elate?

☐ Ühepereelamu ☐ Paarismaja või ridaelamu ☐ Kortermaja ☐ Muu (palun täpsustage): _____

19 Sihtnumber _____

20 Kui kaua olete Tallinna linnas elanud? Ligikaudu _____ aastates

21 Haridus

☐ Põhiharidus
☐ Keskharidus
☐ Kutseharidus
☐ Rakenduskõrgharidus
☐ Bakalaureusekraad
☐ Magistrikraad
☐ Doktorikraad
☐ Muu (palun täpsustage): _____

22 Milliste rühmade hulka tunnete end kuuluvat?

▶ *Võimalus on valida mitu varianti.*

☐ Huvitatud veest ja loodusest töö kaudu
☐ Huvitatud veest ja loodusest hobi kaudu
☐ Sage looduses viibija (jahimees, seeneline, marjuline jne)
☐ Muud tegevused õues (rattasõit, jooksmine jne)
☐ Keskkonnakaitseorganisatsiooni või -sihtasutuse liige
☐ Muu (palun täpsustage) _____

23 Kui suur oli 2019 aastal Teie leibkonna kuu kogutulu koos maksudega?

☐ Vähem kui 700 eurot kuus
☐ 700 – 1199 eurot kuus
☐ 1200 – 1799 eurot kuus
☐ 1800 – 2399 eurot kuus
☐ 2400 – 2999 eurot kuus
☐ 3000 – 3999 eurot kuus
☐ 4000 – 4999 eurot kuus
☐ 5000 – 5999 eurot kuus
☐ Üle 6000 eurot kuus

24 Palun hinnake, millisel määral nõustute järgmiste väidetega.

▶*Märkige igal real ainult üks vastus.*

	Täielikult	Osaliselt	Üldse mitte
a) Küsimustik andis mulle uut teavet väikeste linnajõgede kohta.	☐	☐	☐
b) Küsimustik andis mulle uut teavet sademevee kohta.	☐	☐	☐
c) Olen pärast küsimustikule vastamist rohkem mures Tallinna linnajõgede pärast.	☐	☐	☐
d) Mul oli keeruline öelda, kui palju oleksin valmis sademeveemaksu maksma.	☐	☐	☐
e) Sademeveemaksu kogumine on hea mõte.	☐	☐	☐
f) Pööran tulevikus väikeste linnajõgede seisundile suuremat tähelepanu.	☐	☐	☐
g) Makse tuleks kasutada konkreetsete linnajõgede seisundi parandamiseks.	☐	☐	☐

25 Palun andke hinnang ka küsimustiku kohta.

a) Kui huvitav oli küsitluse teema skaalal 1-5?

5 on väga huvitav ja 1 ei ole üldse huvitav. _____

b) Milline on Teie hinnang käesolevale küsimustikule skaalal 1-5?

5 on väga hea, 1 on väga halb. _____

Kui Teil on mõtteid Tallinna linnajõgede, nende seisundi ja bioloogilise mitmekesisuse parandamise kohta või soovite küsimustikku kommenteerida, kirjutage oma märkused allpool esitatud väljale.

_____

_____

_____

_____

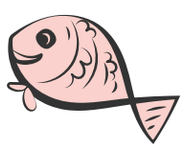
_____

_____

_____

_____

Täname vastamast!



Teie vastuseid käsitletakse rangelt konfidentsiaalsena.

Soome keskkonnainstituut SYKE 2020.
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