People's knowledge, opinions and interest about small waters in Söderhamn

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November 2020

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We would also like to thank Ingela Granlund from Municipality of Söderhamn for the tremendous help she provided in preparing the questionnaire, cost-benefit analysis and their reporting for Söderhamn.

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.

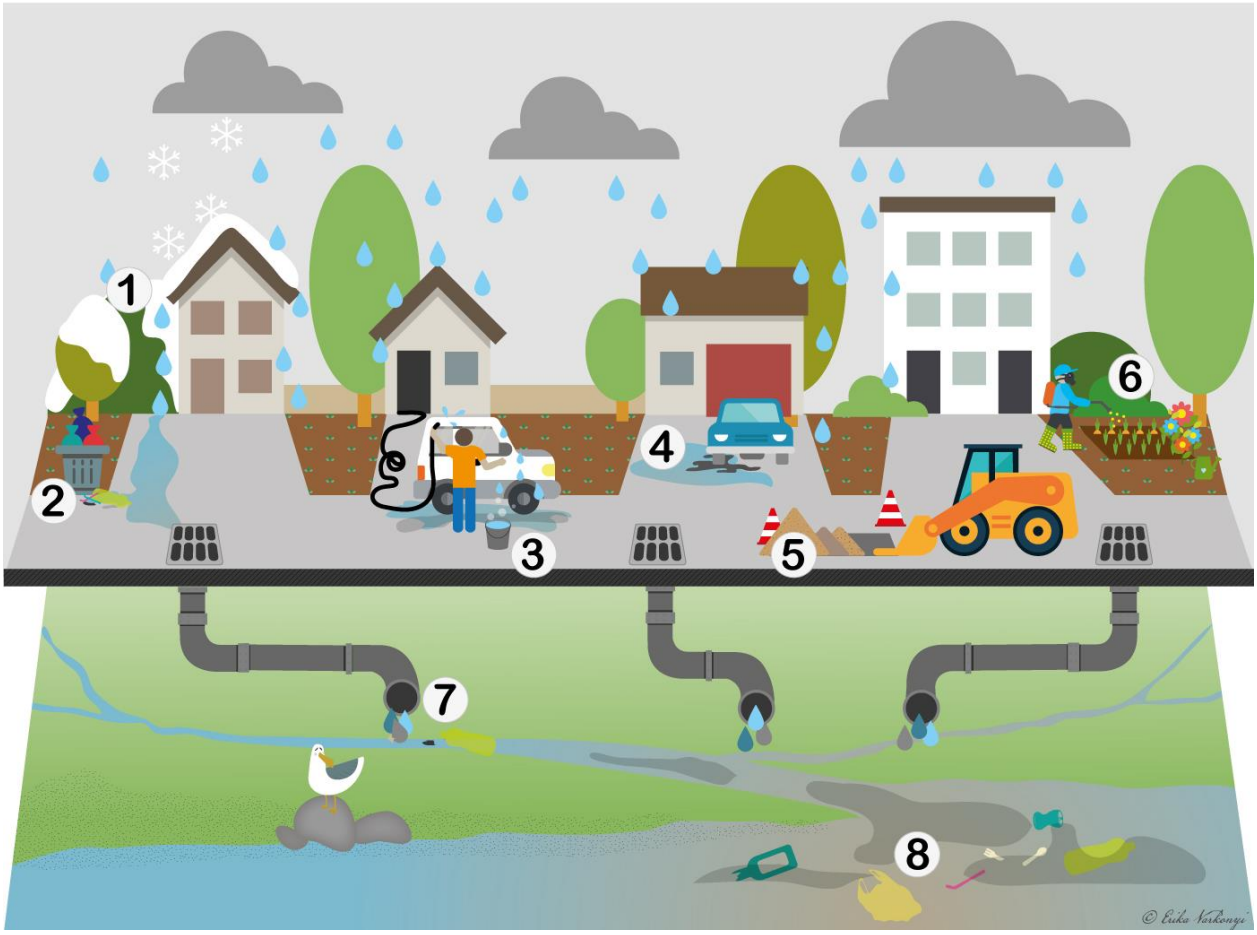
The overall goal of the Heawater project was to demonstrate possible and sustainable solutions to achieve better water quality in small, urban watercourses around the Baltic Sea. In addition, the aim was to raise awareness of the benefits of better water quality in small urban streams and the impact 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 Söderhamn, 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 Swedish version can be found in the country specific Deliverable (Lehtoranta et al. 2020, Deliverable 3.1.3). The Swedish version of the questionnaire can be found in Appendix 2 in this report.

2. Survey

The surveys also served as a communication tool, as in addition to the 25 questions, they 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 surveys 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 The study area and target population

Söderhamn is a 400-year-old town at the bottom of Söderhamn Bay. The city has developed along the Söderhamnsån River, and the river has always been important for the city's traffic, fishing and trade. The catchment area of Söderhamnså is 92.3 km². Söderhamn is home to about 26,000 people. Söderhamnsån flows through woodlands, agricultural land and residential areas. Heavy rains and melting snow easily cause flooding, as the flow increases sharply because there are very few flow-compensating lakes in the catchment area. Both the river and the bay are impacted by a high loading of solids and high nutrient concentrations, resulting in eutrophication. With stormwater, harmful substances also end up in the river and bay. Söderhamn Bay is particularly sensitive to environmental impacts because it is both narrow and shallow.

The water quality of Söderhamn has been studied since the 1970s, and in 2018 an extensive study was carried out on the state of Söderhamnså water. According to the latest classifications, the ecological status of Söderhamn Bay is poor and that of Söderhamnså is moderate. However, trout breed in Söderhamnså.

The survey area in Söderhamn was already defined in the project application. A random sample of addresses for 1,200 people from Söderhamn was ordered by JP Postitus Oy from Data Refinery Oy. The gender distribution was set equal, so 600 women and 600 men were included in the sample. The survey was aimed at residents living around Söderhamnsån and the inner part of Söderhamnsfjärden (Figure 3.1), and the postal code areas were used to delimit the area. Because of the aim to include the northern part of Söderhamnsfjärden, the questionnaire was also sent to residents with the postal code 82691, even though some of these lived far from Söderhamnsån. The survey was targeted at people in the age range of 18–79 years and at one respondent per household. However, as the survey progressed, it became apparent that some of the addresses (n = 266) were out of date. The company that collected the address and name information was requested to provide new personal and address information for these addresses.

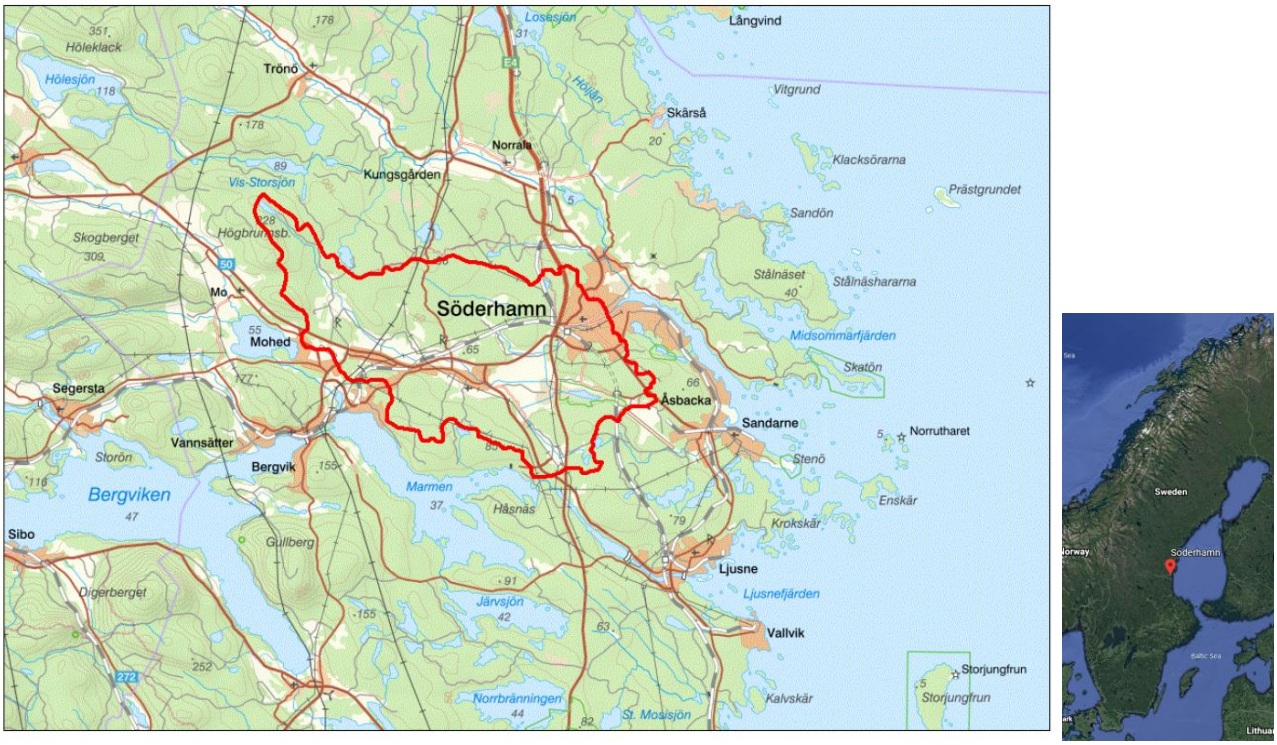


Figure 2. Study area in Söderhamn the study area outlined in red. @Municipality of Söderhamn

2.2 Survey implementation and response activity

The Finnish Environment Institute (SYKE) designed and otherwise executed and managed the questionnaire in cooperation with the municipality of Söderhamn. The questionnaire was tested in March and April 2019 by sending it to a several residents in Söderhamn. Based on the comments received from the testers, minor changes were made to a few questions. The survey was conducted in Söderhamn in summer 2019, in Swedish, and both as a paper and an Internet questionnaire.

In order to increase the response rate and representativeness of the data, respondents were contacted a total of four times: first by sending them a paper questionnaire, then with two reminder cards and finally again by sending a paper questionnaire. All questionnaire materials for the Söderhamn study can be found in Swedish in Lehtoranta et al. (2020c). as attachments. The cover letters and reminder cards were signed by John-Erik Jansson, Chairman of the Municipal Board of Söderhamn.

@Virpi Lehtoranta

Internet questionnaires were open until the end of August 2019, and the last paper responses were read on 11.9.2019. The survey materials were sent as follows:

- Paper questionnaire and cover letter 1 mailed May 5th
- Paper questionnaire and cover letter 1 with new fixed addresses mailed June 12th

- First reminder card to the original addresses mailed June 12th
- First reminder card to the new addresses mailed July 1st

- Second reminder card to the original addresses mailed June 24th
- Second reminder card to new addresses mailed July 15th

- Second paper survey and cover letter 2 to the original addresses mailed July 2nd
- Second paper survey and cover letter 2 to the new addresses mailed August 1st

In the second, third and fourth mailings, most of those who had already responded by then were removed from the recipients list. In total, 475 responses were received. After eliminating empty replies (16), double replies (17) and 28 replies from the postal code 82661, which was outside of the study area, the final data set comprised 424 respondents, representing a response rate of 35.3%, which can be considered good. A total of 348 (82%) responded on paper and 76 (18%) via the Internet.

All the results of the questionnaire can be found in Appendix 1. About 48% of the respondents were women which corresponded well to both the sample and the population. The youngest respondent was 23 years old and the oldest 92 years old. However, the average age of the respondents was approximately 64 years which was higher compared to the recipients and the population (Table 1). The mean age of the respondents in the dataset can be compared to the mean age of the Söderhamn adult population (22 years or over), which is about 55 years, calculated from Table 1. Contrary to the study aim, for some reason young adults, ie 18–22 years old, were not included in the sample. The comparison shows that the older respondents were overrepresented in the data. The proportion of respondents under the age of 50 was only 15%, compared with 42% of the adult population in Söderhamn. This is a factor which should be considered when generalizing the views and other results of the survey.

Table 1. Comparison of sample population and respondent population by age

	Population in Söderhamn		Respondents	
20 – 29 years	1 575	15 %	12	3 %
30 – 39 years	1 335	13 %	26	6 %
40 – 49 years	1 487	14 %	36	9 %
50 – 59 years	1 770	17 %	68	17 %
60 – 69 years	1 682	16 %	90	22 %
70 – 79 years	1 680	16 %	116	28 %
Total	9 529	100 %	408	100 %

2.3 Willingness to pay scenario in the questionnaire

To assess willingness to pay a scenario of a mandatory payment (VA tariff i.e., “The water and sewage tariff”) was created in the Söderhamn survey. In the scenario, the respondent had to imagine that, in order to finance the proposed activities, residents could pay a stormwater management fee as explained in the survey:

“*The Municipality of Söderhamn has adopted a stormwater strategy. It aims to develop the municipality's stormwater management towards a more sustainable approach. The strategy focuses on water quality but also wants to show how stormwater can be utilized and deal with challenges arising from climate change and when urban environments are more densely built up.*

More money is needed to achieve sustainable stormwater management. Now, imagine that the inhabitants of Söderhamn would pay a stormwater fee included in the regular VA tariff over the next ten years to make stormwater management more sustainable.”

Respondents were told what changes would be seen in terms of a reduced risk of flooding along the rivers and in central Söderhamn, and improved water quality in Söderhamnsånand Söderhamn Bay. Management actions would also create increasingly diverse habitats for wildlife and plants in Söderhamnsån and the urban environment, as well as more places for recreation and socializing.

After presenting the environmental objectives and method of financing, the respondents were asked whether they would be willing to pay a monthly stormwater payment at all and, if so, what amount they would be willing to pay.

3. Results and their review

3.1 Use of waters and perceived water quality

Majority of respondents (55%) lived in detached houses, one in three in apartment buildings and one in ten in semi-detached or terraced houses.

It was asked in the survey what the respondents thought about the current water quality on Söderhmansån and Söderhamnsfjärden. Only one in 100 respondents considered their condition to be excellent. About one in ten considered them good. Respondents seemed to think that Söderhamnsfjärden was in a better state than the Söderhamnsån, as can be seen in figure 3. More people were unsure about the state of the Söderhamnsfjärjden (32%) than about the state of the Söderhamnsån (23%).

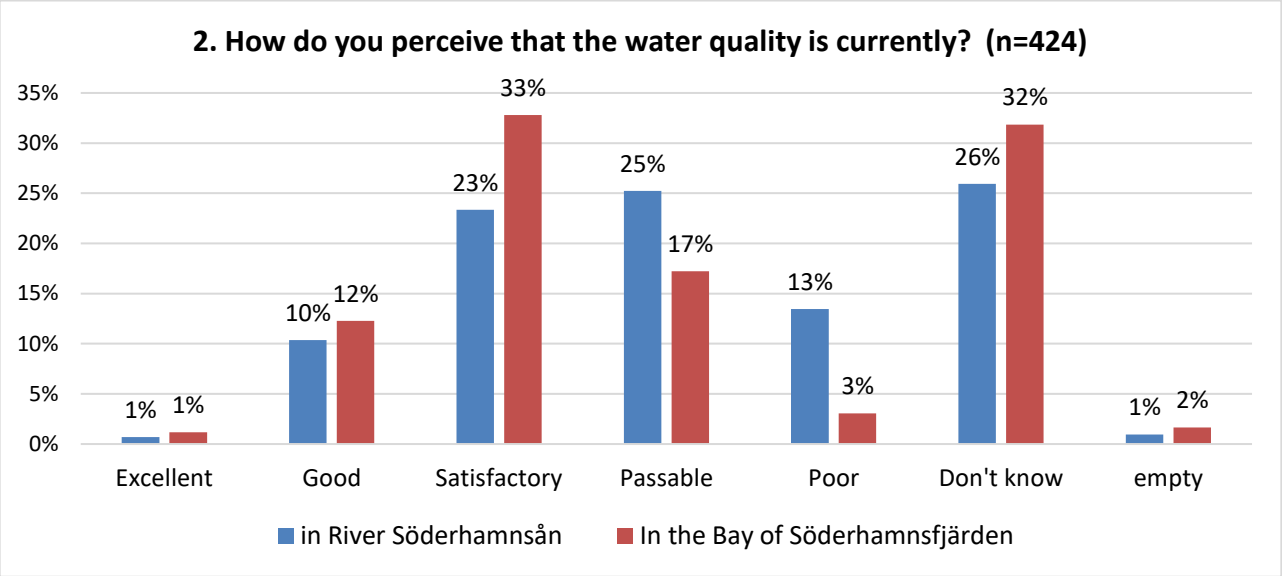


Figure 3. Respondents' perceptions of water quality in Söderhamn.

Next it was asked how the residents use Söderhamnsfjärden and Söderhamnsån and nearby areas for recreation. The most popular among the respondents was exercising, jogging etc. and the next most popular one was just spending time and socializing along the river (see figure 4).

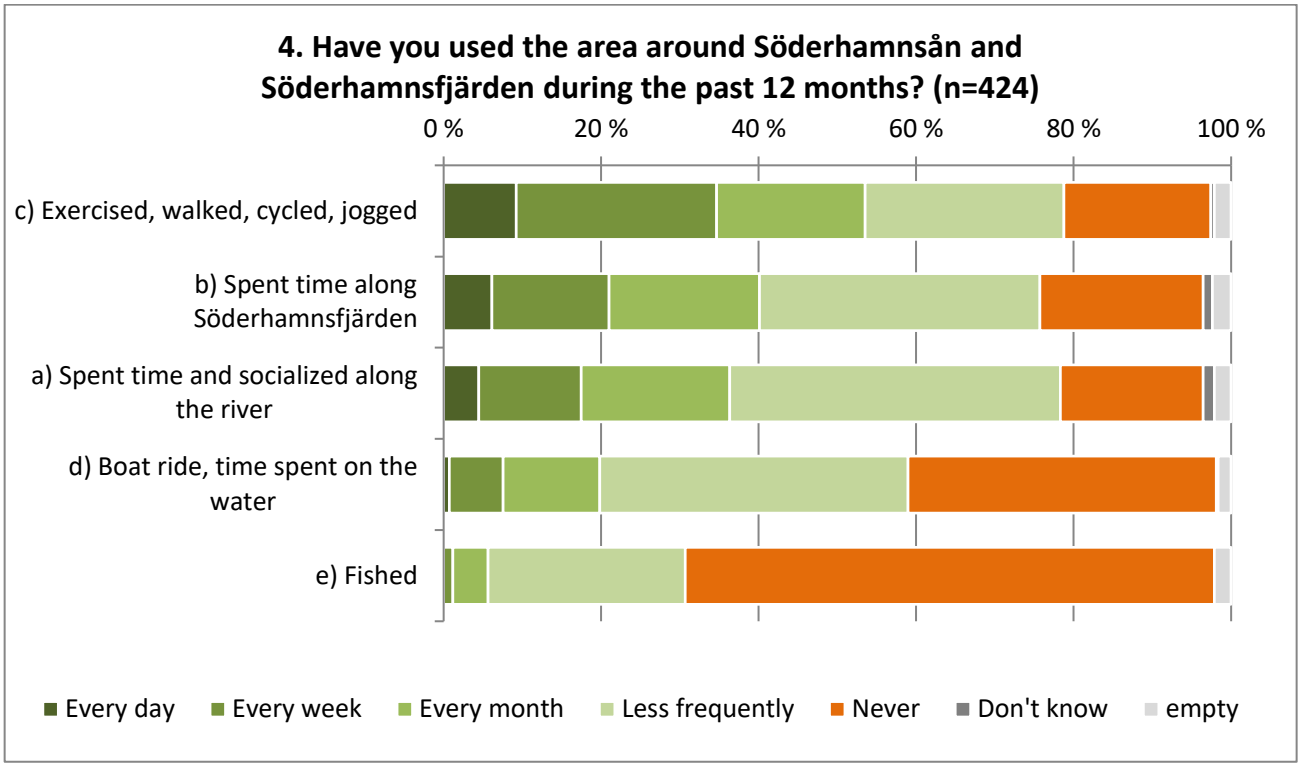


Figure 4. Respondents' outdoor habits during the past year.

At the beginning of the survey, recipients were asked to consider whether the public financing of the various locally important topics should be changed. The purpose of the question was to assess the importance of improvement of the water quality in Söderhamnså in relation to other important public expenditure issues in the area. Out of the given options, over 70% of respondents thought that it would be very important to direct tax payments into maintaining the municipal street and road network. Almost 40% of respondents thought that it would be very important to improve the water quality of Söderhamnså. The majority of respondents felt that the Söderhamnså is important to them and about half was worried about its state (Figure 5). A smaller proportion of respondents was concerned about the state of the archipelago.

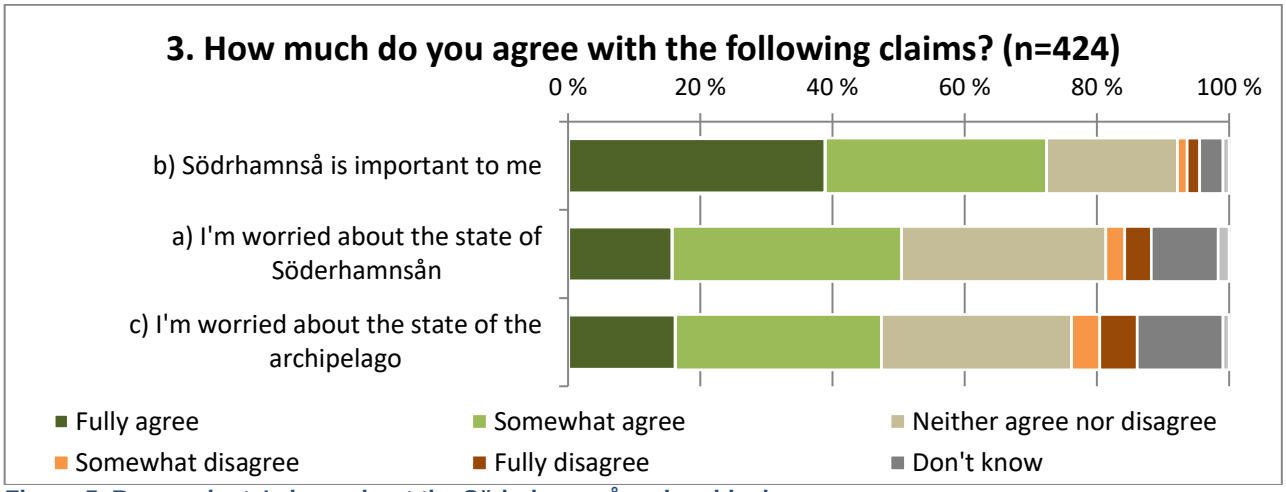


Figure 5. Respondents' views about the Söderhamnså and archipelago.

3.2 Stormwaters and their sustainable management

The quantity and quality of urban stormwater is crucial to the state of Söderhamnså and therefore also Söderhamnsfjärden. 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 gave examples about which human activities have an impact on stormwater quality.

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

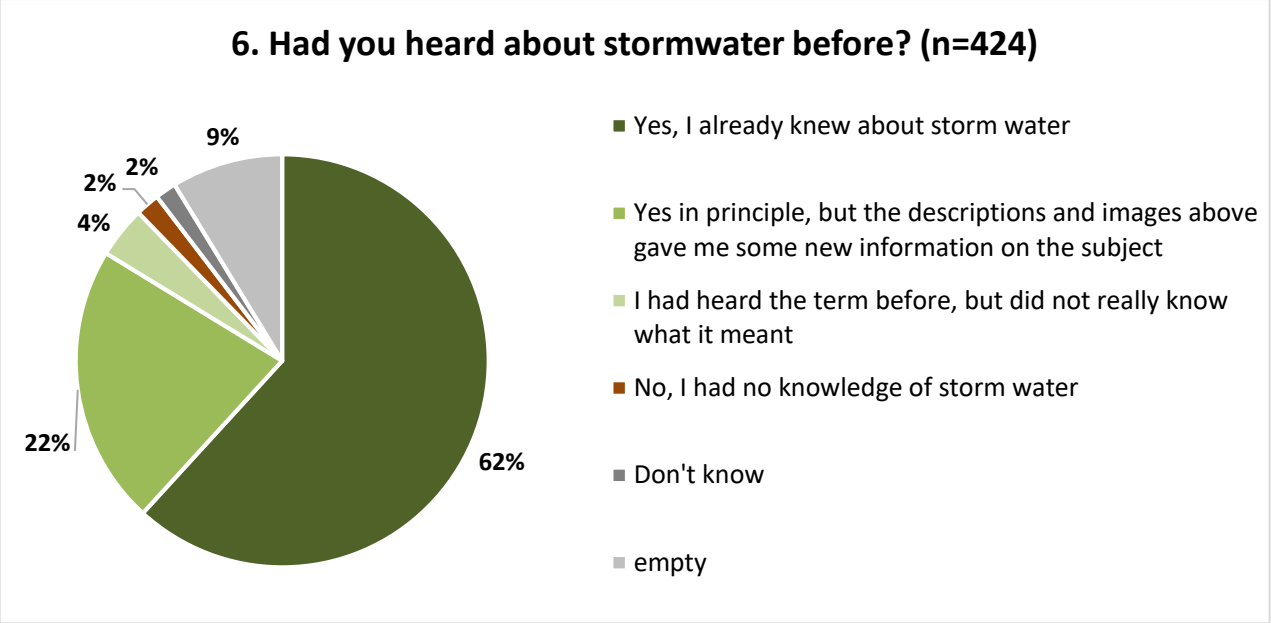


Figure 6. Familiarity of stormwater for Söderhamn residents.

Recipients were then asked for their views on the various claims concerning the river and stormwater (Figure 7). Respondents prioritized improving the living conditions of fish such as trout. Little less than 40% of respondents also believed they could influence the state of the river through their own actions. About 12% of respondents thought that there is no problem with the water quality of the river. Only little more thought the same about flooding around Söderhamnsån. In fact, nearly 20% of respondents felt that the flooding had increased during the last decade.

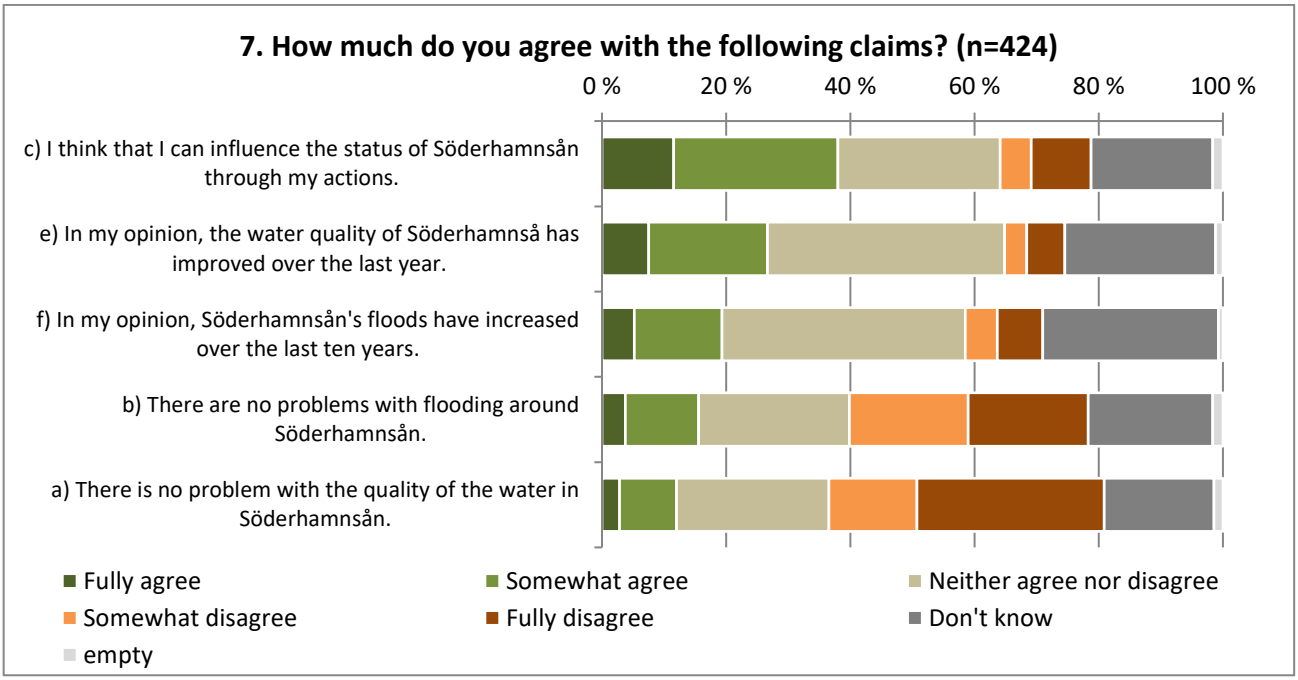


Figure 7. Opinions about the Söderhamnsån and stormwaters.

Recipients were further elaborated on the effects sustainable management of stormwater could have. The texts of the topic and the pictures drawn by the project can be found on page 7 of the questionnaire (Appendix 2). Respondents were asked if natural stormwater management could make a difference for themselves or for the inhabitants of the area. Nearly 70% believed that they could have a major or moderate positive impact on the attractiveness of Söderhamn (Figure 8). More than half expected large or moderate positive effects on the nature experiences and the well-being of people. About half thought that it could have a positive impact on the amount of their recreational visits to the river and its' green areas. For all alternatives, 4–10% did not believe that natural stormwater management would have such effects.

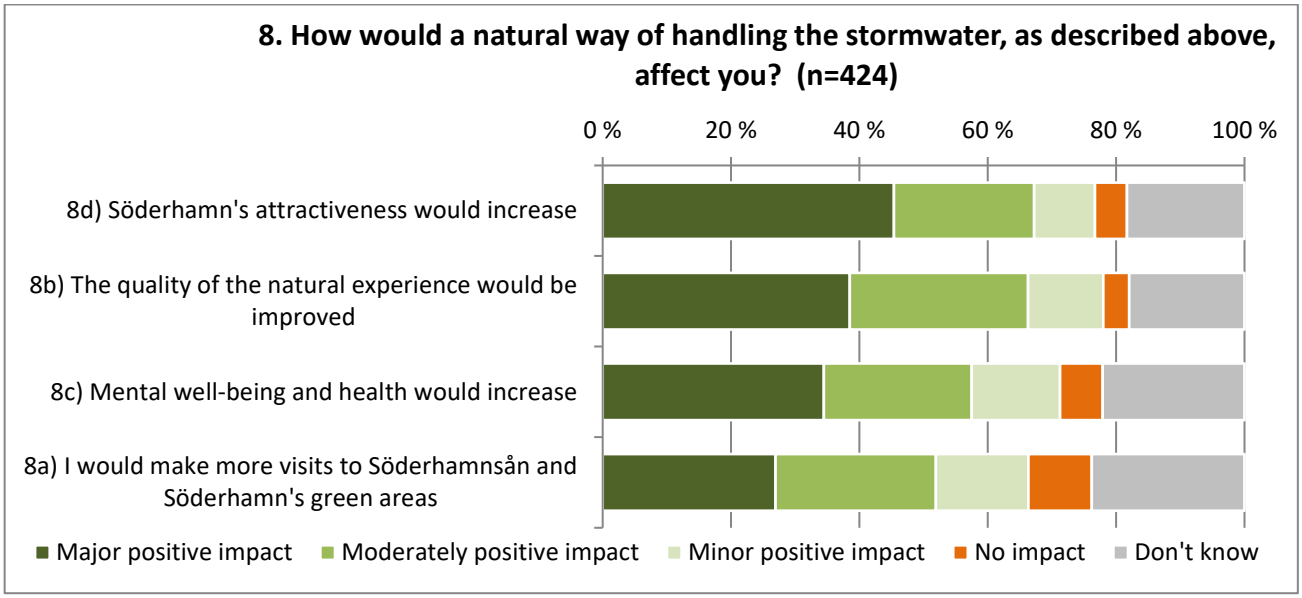


Figure 8. Opinions about the effects of natural stormwater management.

3.3 Willingness to pay for stormwater management

The starting point for the study was the stormwater strategy developed in 2018 for Söderhamn. The Heawater project sought to determine the non-market benefits that arise from sustainable stormwater management. The research method used was the contingent valuation method, one of the stated preferences methods.

The aim of the study was to produce a monetary estimate of the well-being of residents for the implementation of the stormwater strategy over the next ten years. In order to assess the positive environmental changes brought about by the implementation of the strategy, a valuation survey was conducted, which produced an estimate of the lower and upper value of the total benefits. Thus, one of the main purposes of the survey was to identify the willingness of residents to contribute to the implementation of the stormwater strategy through a stormwater fee.

The willingness to participate was determined in the survey by two questions: would the respondent be prepared to participate in stormwater charges at all and, if so, what monthly amount during 2019–2028 would they be willing to pay. Over half of all respondents (58%) would at least consider paying a stormwater fee between 2019 and 2028 to increase the more sustainable ways of handling stormwaters (Figure 9).

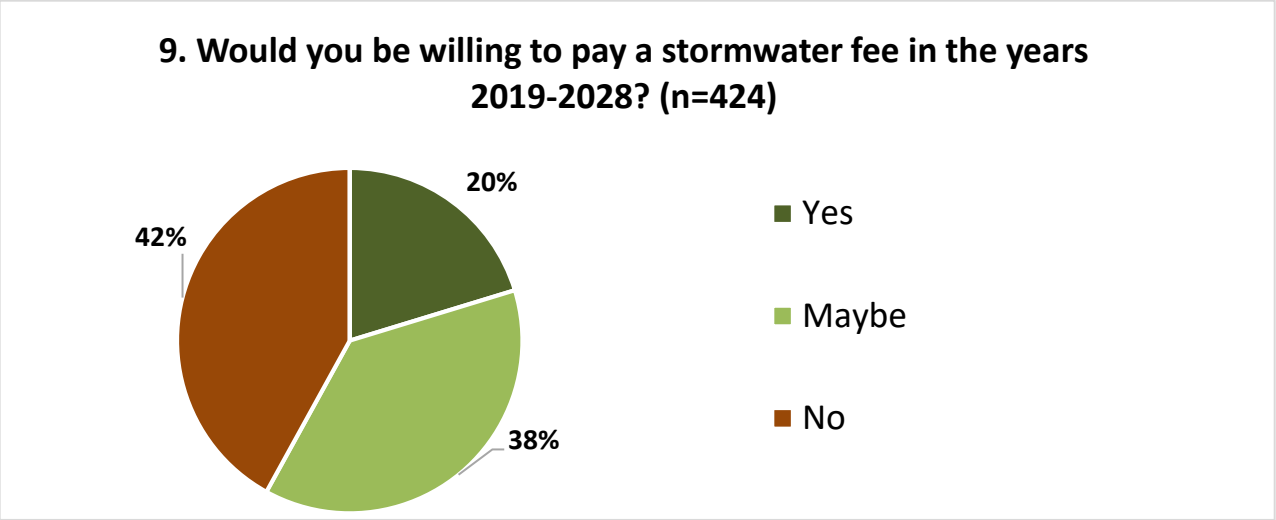


Figure 9. Willingness to pay the annual stormwater fee

Respondents who were willing or potentially willing to pay were then asked how much they would pay each month for the next ten years. Figure 10 shows how the responses were distributed in terms of the chosen payments and the certainty related to payment. Two respondents expressed a willingness to pay €50 per month for the next ten years. The veracity and credibility of these responses were assessed by reviewing the whole response forms of these respondents. The respondents were concerned about the state of the river and the Gulf, and the responses did not appear illogical or unbelievable. Thus, these two responses were left in the data.

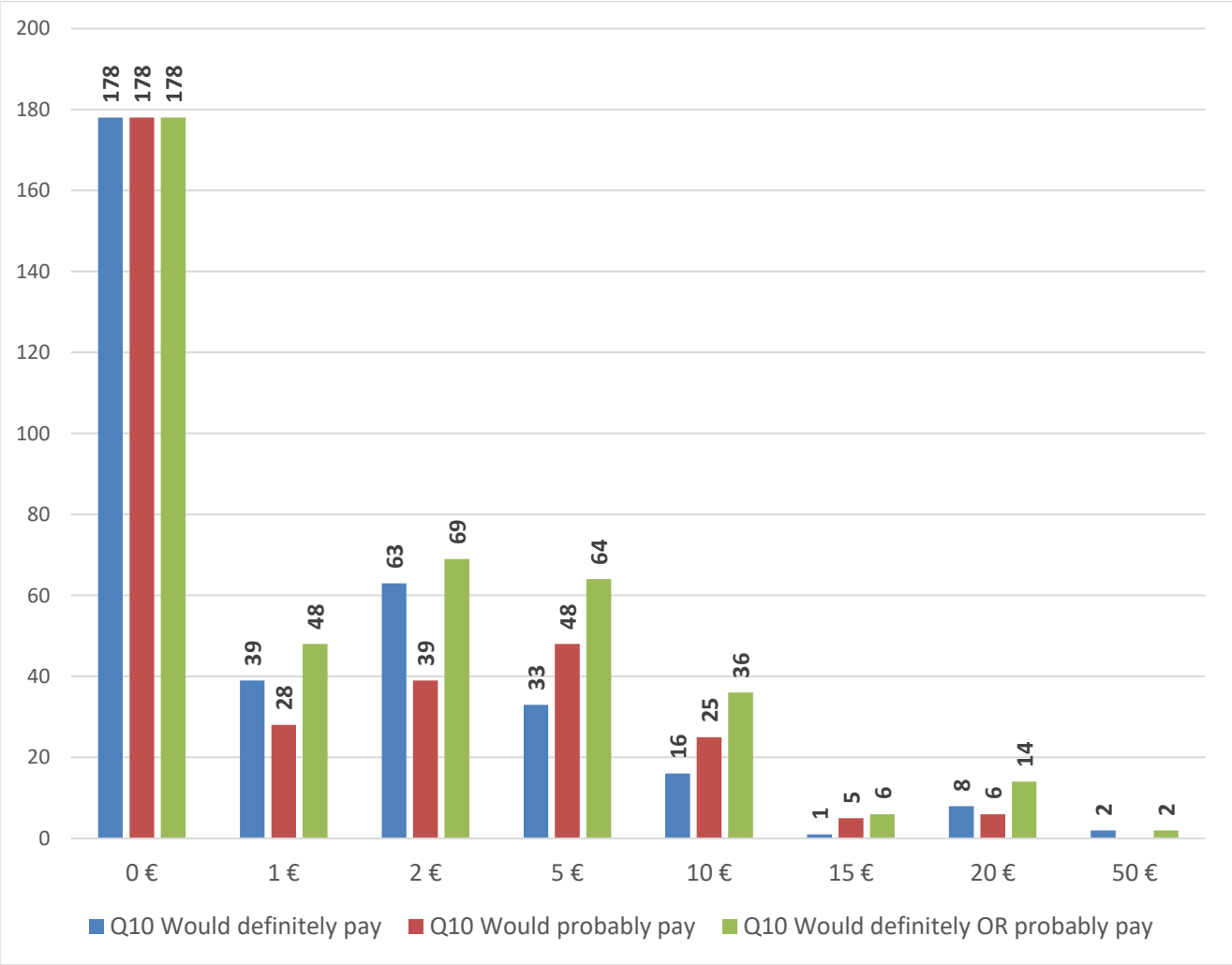


Figure 10. Distribution of chosen monthly payments per person and the related certainty (the Söderhamn study).

As shown in Table 2, the respondents were, on average, prepared to pay approximately €2.30–4.70 per month, depending on the certainty of the answer, for the next ten years. An interesting result was that the younger age groups chose higher amounts from the available payment amounts than the older respondents (see Figure 11).

Table 2. Respondents' (n = 424) average annual willingness to pay per person and standard deviation [€] for more sustainable management of stormwater for the next ten years.

Certainty expressed by respondents about paying the monthly fee of their choice	Willingness to pay (WTP) [€/year/person]	
	Lower bound (Turnbull estimate*)	Upper bound (Kriström estimate*)
I would definitely pay	25.9 (60.6)	39.4 (57.9)
I would definitely or probably pay	36.9 (64.8)	54.6 (66.2)

**) (See Kriström, 1990; Turnbull, 1976). In addition, monthly willingness to pay was multiplied by 12 and the krona was converted into euros at a rate of 0.096*

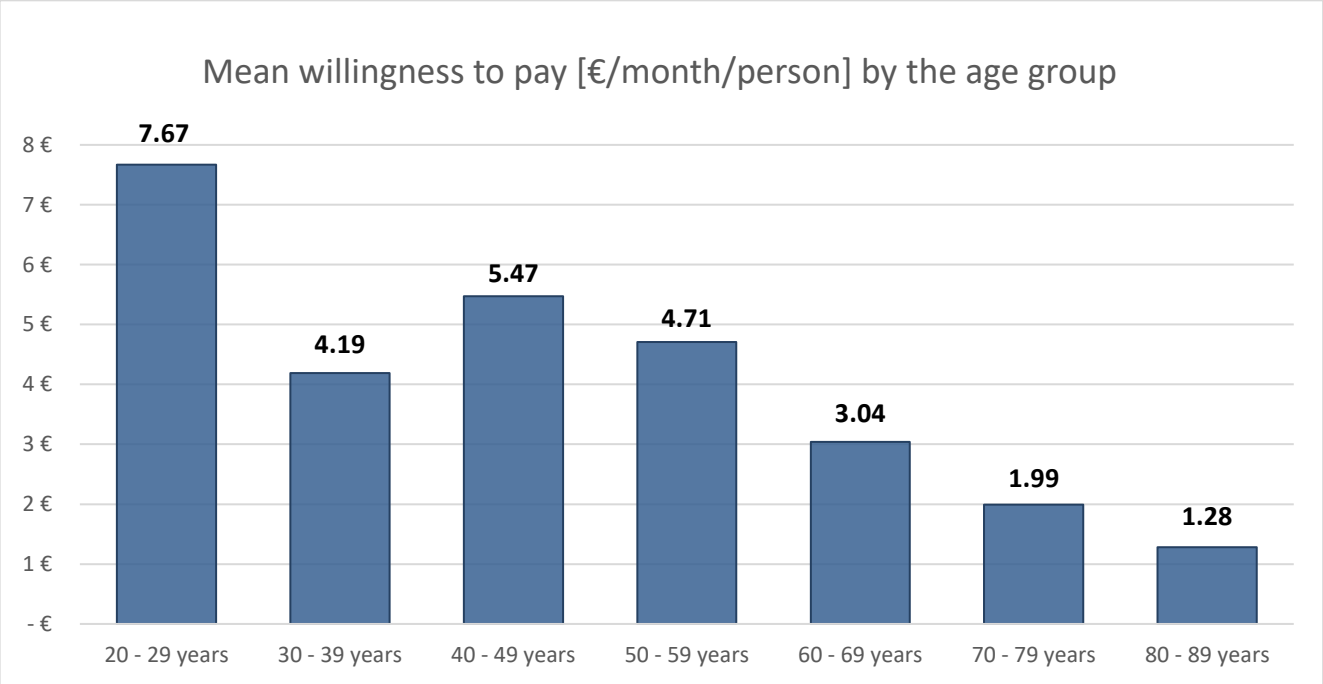


Figure 11. Distribution of the mean willingness to pay sums [€] that respondents (n = 401) were definitely willing to pay or could at least imagine paying (Q10) according to the age group (the Söderhamn study).

The most important reason for willingness to pay was most often the desire to improve the natural life in and around the Söderhamnså. The next most important reasons stated were the desire to get a greener city and to support more natural ways of managing stormwater to reduce the risk of flooding (Figure 12).

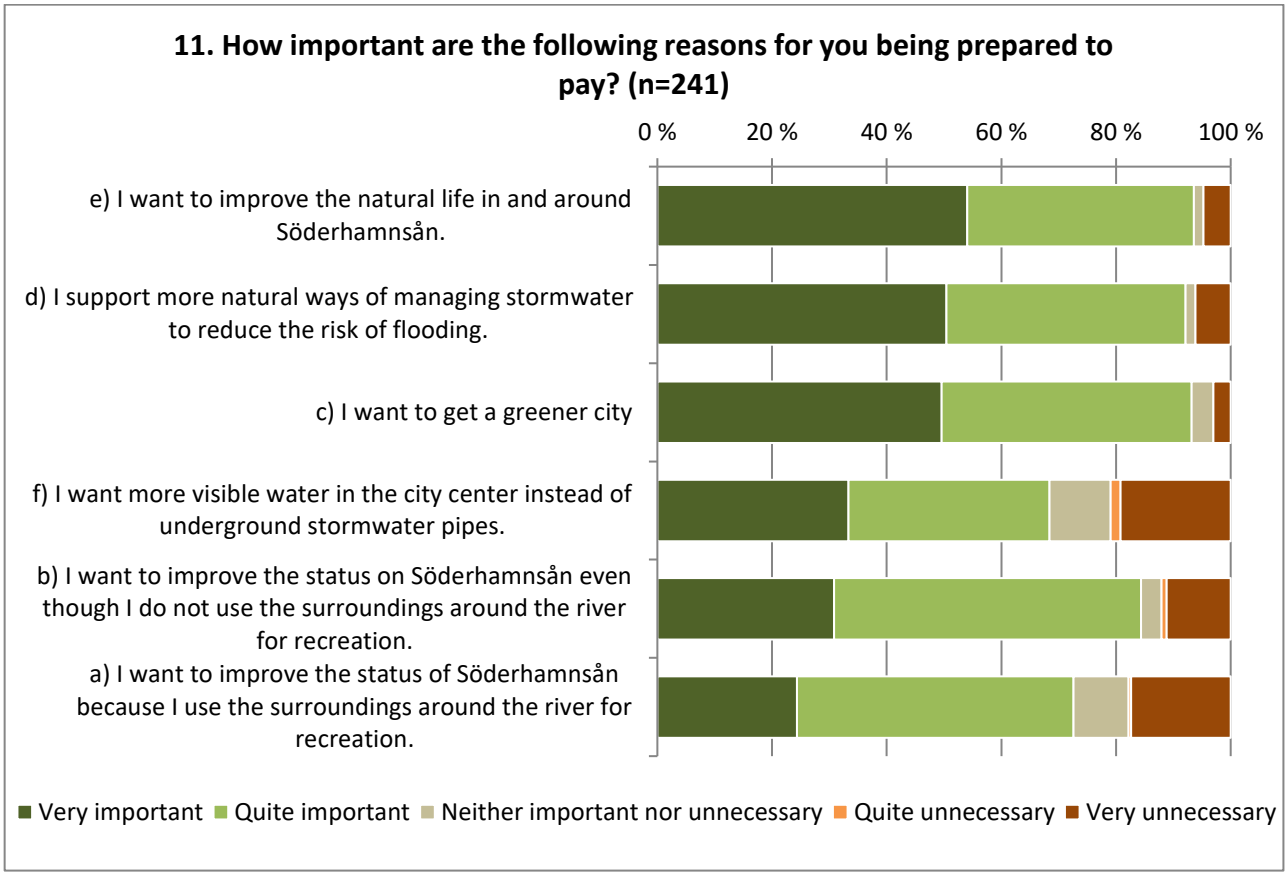


Figure 12. Causes for being prepared to pay and their importance.

The most common reason for non-payment was that respondents felt they could not afford to pay. The second most common reason was that they felt that the Söderhamnsån does not need any more measures to protect against flooding or purification of the water (Figure 13).

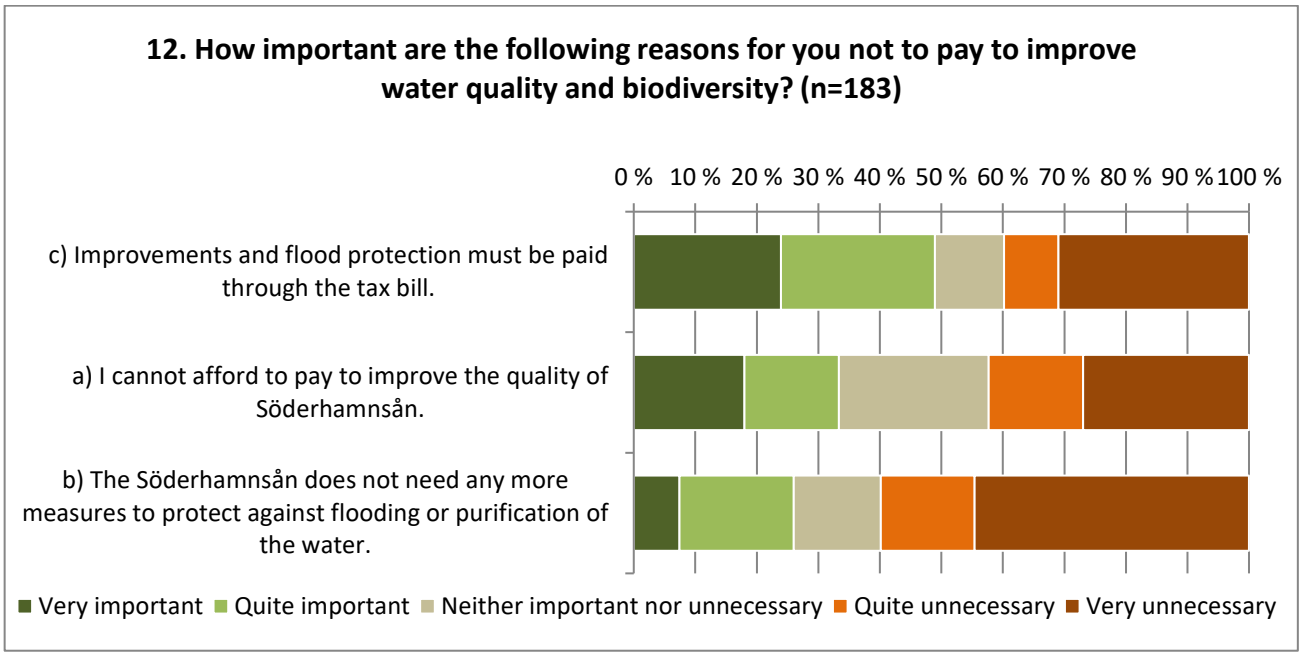


Figure 13. Causes for not being prepared to pay and their importance.

3.5 Fundraising

Respondents were asked the best way to raise money from citizens for more natural treatment of stormwater. There were clear differences between those willing and unwilling to pay (Figure 13). Those willing to pay favored the raising of VA tariff (42%) where as those unwilling to pay favored none of the suggested mechanisms (46%). The popularity of voluntary payment was slightly higher among those willing to pay (20%) than among those who were unwilling to pay (12%). The tax increase was second most popular for both groups, those willing and unwilling to pay.

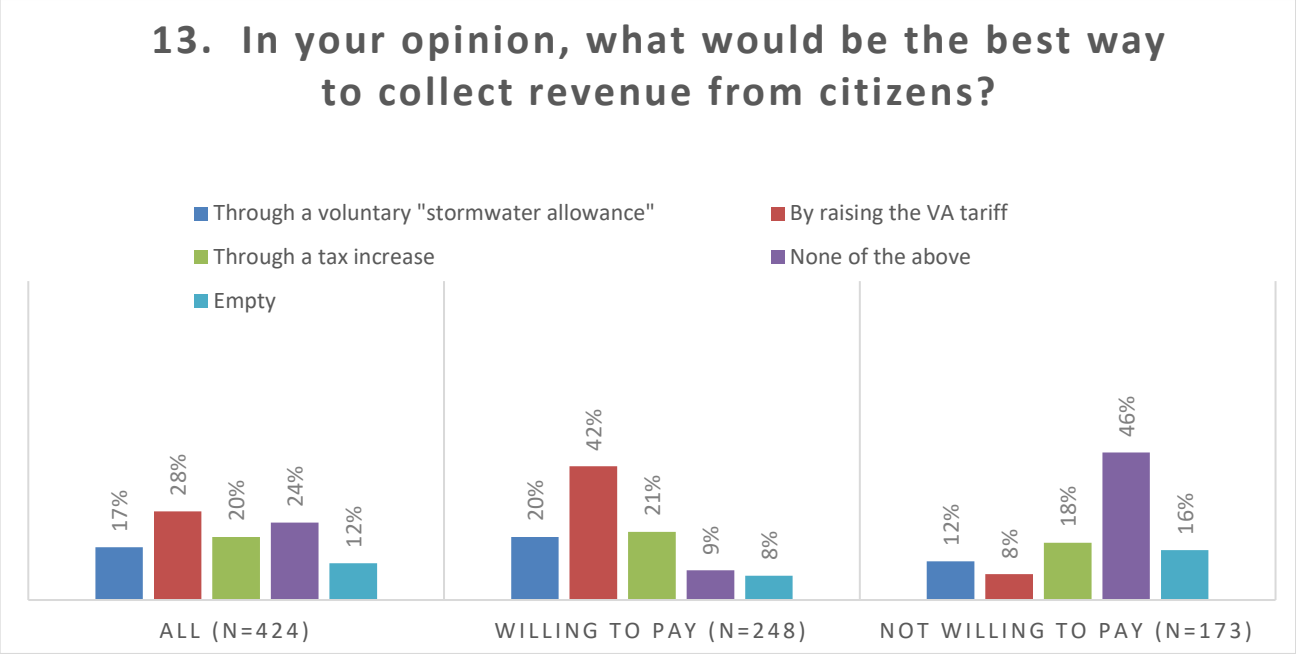


Figure 14. Preferred ways for raising funds for more natural treatment of stormwater and improving the condition of urban streams

The survey also sought to discover respondents' activity in dealing with Söderhamnsån or stormwater events. At the same time, it was important to remind them that small everyday actions can have an impact. Only 5% of respondents had participated in volunteer work to restore Söderhamnsån. (Figure 15).

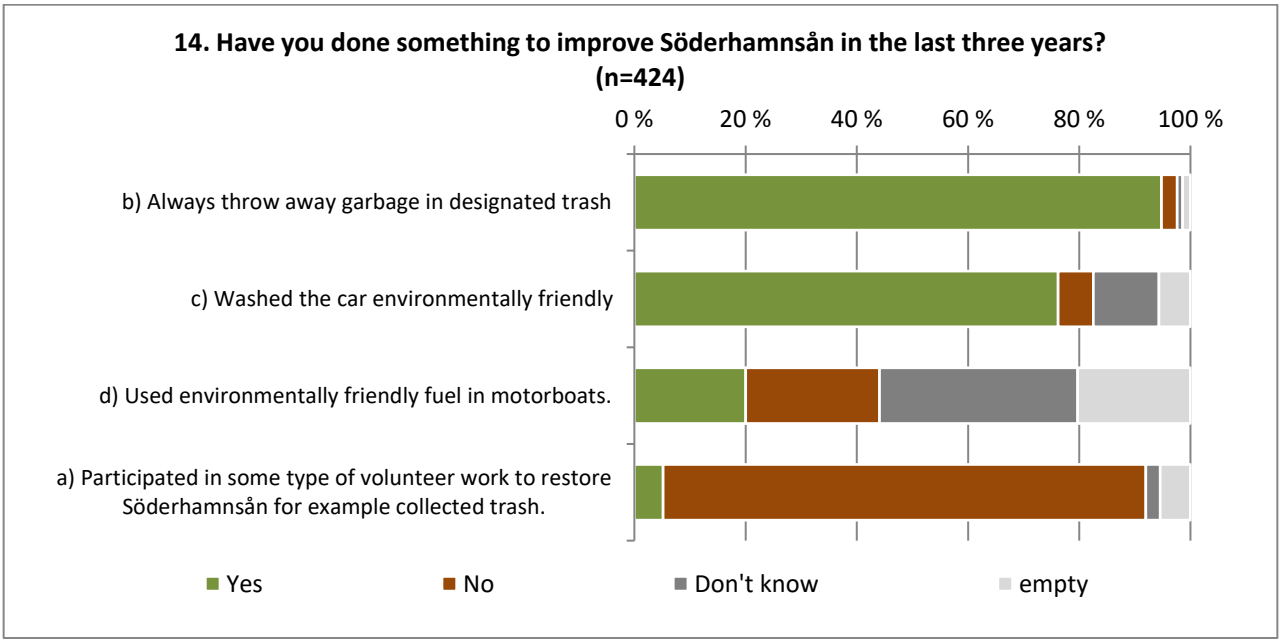


Figure 15 Respondents' actions to improve the state of the river.

Over 80% received at least some new information about Söderhamnsån through this survey and almost as many about stormwater. Almost as many also said they would be more interested in Söderhmansån and stormwater in the future. About 60% was more concerned about the state of the Söderhamnsån after responding to the survey. Little less than 50% of respondents thought that raising funds through a stormwater fee would be a good idea. (Figure 16.)

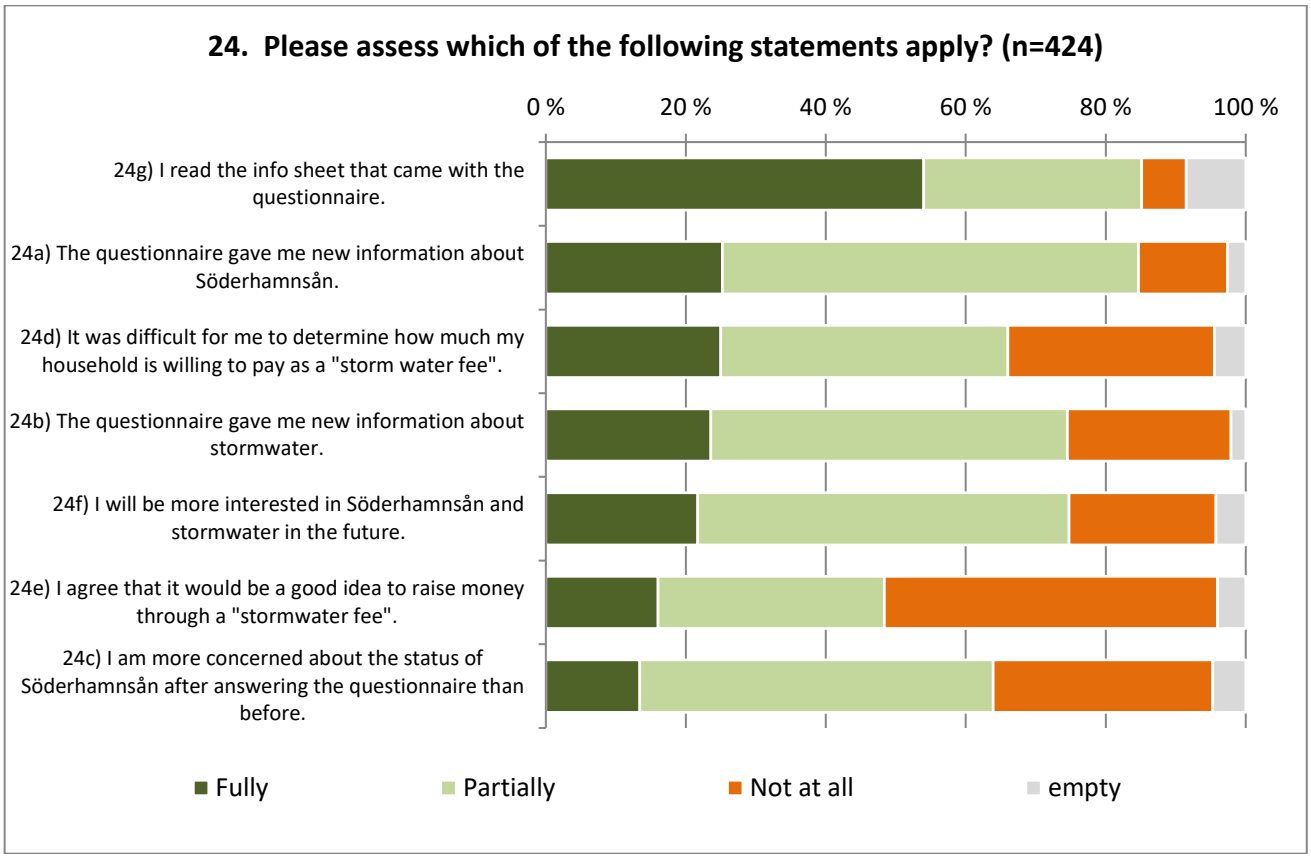


Figure 16. Opinions regarding the matters involved in the questionnaire.

4. The validity of benefit data

About 48% of the respondents were women, which corresponded well with both the sample and the population. The youngest respondent was 23 years old and the oldest 92 years old. However, the average age of the respondents was approximately 64 years, which was higher compared to the survey recipients and the population (Table 3). The mean age of the respondents in the data set can be compared to the mean age of the Söderhamn adult population (22 years or over), which is about 55 years, calculated from Table 3. The comparison shows that the older respondents were overrepresented in the data. The proportion of respondents under the age of 50 was only 15%, compared with 42% of the adult population in Söderhamn. This is a factor that should be considered when generalizing the views and other results of the survey.

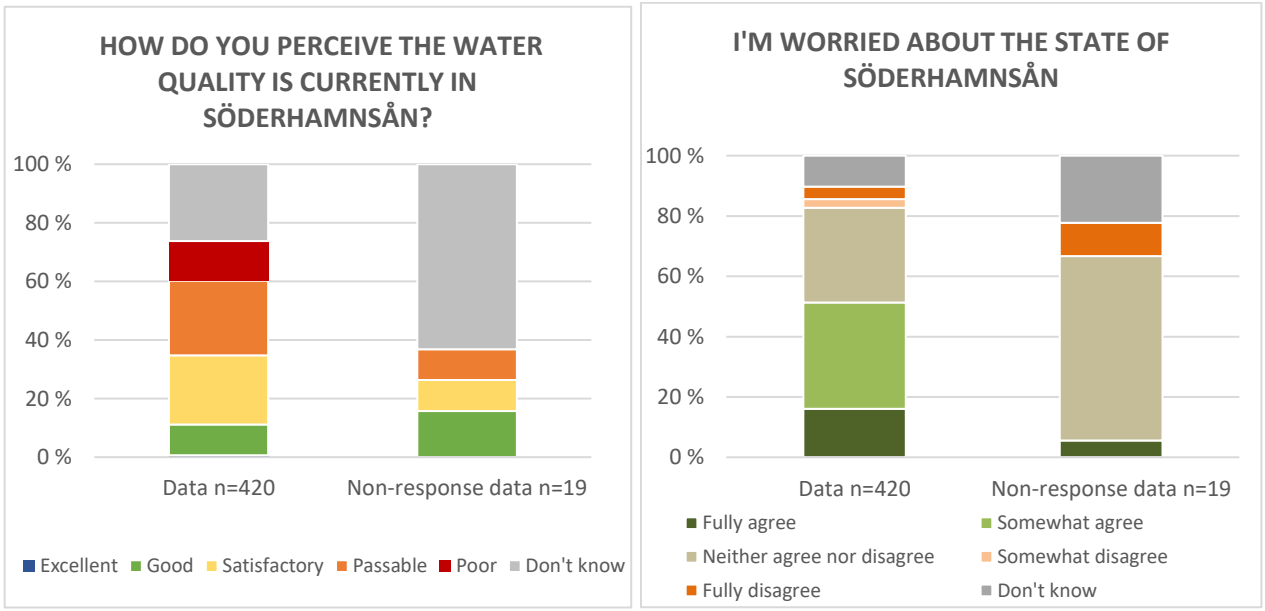
Table 3. Comparison of the sample population and respondent population according to age

Age group (years)	Population in Söderhamn		Respondents	
20–29	1,575	15%	12	3%
30–39	1,335	13%	26	6%
40–49	1,487	14%	36	9%
50–59	1,770	17%	68	17%
60–69	1,682	16%	90	22%
70–79	1,680	16%	116	28%
Total	**9,529**	**100%**	**408**	**100%**

The reliability of the data can be assessed by simply comparing the willingness to pay estimates given by the respondents in different phases of the survey process. If the answers of the quicker respondents differ from those of the slower respondents in this respect, this may be an indication that the data do not fully represent the studied population. The speed of responding, i.e. whether a person responded on time or after a reminder, did not have a statistically significant effect on the mean willingness to pay estimate. On average, the use of willingness to pay to calculate total willingness to pay may therefore be justified on the basis of this analysis.

In addition, the reliability of the obtained survey data was analysed by means of a follow-up survey, in which a group of non-respondents was sent a short questionnaire on the reasons and attitudes related to not responding (so-called non-response analysis). Thus, in March 2020, a two-page questionnaire was sent to 100 non-respondents to find out why they had not responded to the original questionnaire, and whether their opinions varied from the respondents in the final data set. The questionnaires were printed and mailed in the municipality of Söderhamn from 16–27 March 2020. This questionnaire was sent only once and a total of 19 responses were received.

The most common reasons for not responding to the original survey were that the respondents felt that they did not know enough about city streams or stormwater to respond, that they did not have time to answer it and that they do not usually respond to questionnaires. Compared to the actual response data (26%), a significantly higher proportion respondents to the non-response survey (63%) could not say in what state they thought Söderhamnsån was. Similarily, the respondents to the non-response survey were not as concerned about the state of Söderhamnsån as respondents in the final data (Figures 17a and 17b). According to the results of the non-response survey, the data gained from the original survey might not fully explain the preferences, ideas and attitudes of the study population. Thus, it is advisable to use the most conservative willingness to pay estimates for the aggregation of total benefits.



Figures 17a & b. Comparison of the final survey results and the non-respondent survey results.

5. Environmental benefits

The environmental benefits of more sustainable stormwater management were assessed based on the responses to the environmental valuation survey. This survey was based on a random sample of the adult population in Söderhamn. As indicated by the non-response survey results, the most conservative mean WTP estimates were used in the aggregation of the benefit estimates.

Since the average willingness to pay clearly differed between younger and older respondents, this must be taken into account when transferring the results, i.e. benefits. As shown in Figure 12, younger people were more willing to pay higher monthly amounts as a stormwater fee than older respondents.

Based on average willingness to pay according to the age group, it is possible to estimate the willingness to pay of the entire adult population in Söderhamn. About 40% of the respondents were unwilling to pay a stormwater fee. The willingness to pay for this group was assumed to be EUR 0. Tables 4 and 5 summarize the results of the aggregated willingness to pay estimates during 2019–2028 with sensitivity analysis. The total willingness to pay is estimated at about EUR 0.41 ± 0.02 million to EUR 0.51 ± 0.026 million per year for ten years. The benefit assessment reflects the annual benefit to residents that would be achieved by sustainable stormwater management in Söderhamn. During the whole ten-year period, this would amount to EUR 4 million. Note that the benefit estimates are not discounted to the present value.

Table 4. Aggregated willingness-to-pay estimates [kr] respondents had chosen to pay for certain according to the age group, lower bound

Age group (years)	Population in Söderhamn	Proportion (%)	Willingness to pay [€/month]	Willingness to pay [€/year]	Sensitivity analysis, ± 5%
20–29	1,575	15	13,475	16,170	8,085
30–39	1,335	13	2,734	32,803	1,640
40–49	1,487	14	6,134	73,606	3,680
50–59	1,770	17	6,565	78,781	3,939
60–69	1,682	16	3,537	42,439	2,122
70–79	1,680	16	1,604	19,243	962
Total	**9,529**	**100**		**408,573**	**20,429**

Table 5. Aggregated willingness-to-pay estimates [€] respondents had chosen to pay for certain according to the age group, upper bound

Age group (years)	Population in Söderhamn	Proportion (%)	Willingness to pay [€/month]	Willingness to pay [€/year]	Sensitivity analysis, ± 5%
20–29	1,575	15	12,075	144,901	7,245
30–39	1,335	13	5,597	67,161	3,358
40–49	1,487	14	8,137	97,646	4,882
50–59	1,770	17	8,329	99,953	4,998
60–69	1,682	16	5,121	61,448	3,072
70–79	1,680	16	3,346	40,147	2,007
Total	**9,529**	**100**		**511,255**	**25,563**

5.1 Measures and total costs

For the analysis in the Heawater project, only those stormwater management measures were chosen that would have both flood-reducing and water quality effects. The suggested measures stem from discussions during the Heawater project, as well as from the Sweco Environment (2017) report.

Investment costs have been updated and maintenance costs have been added. Table 6 summarizes the estimated total costs over a ten-year period in three hypothetical situations: A, B and C. The total sum for the planned budget for these stormwater facilities in situation A is EUR 0.18 million for a ten-year period, comprising the total costs of constructing, implementing, operating and maintaining the measures. All these cost estimates were received from the municipality of Söderhamn. Among the measures and their cost estimates are also the restoration projects implemented in Söderhamn by the Heawater project.

In situation B, these measures were complemented by two sets of measures to even better fulfil the list of environmental changes illustrated in the willingness to pay scenario of the questionnaire. That is, increasing biodiversity in different ways (along and in the river) and even further improving the recreational potential of the riverside. Cost estimates for such measures were taken from the Helsinki Small Water Programme (2007), which was also used in the analyses of the Turku pilot case. Adding these cost estimates to the previous, the total cost is EUR 0.2 million for situation B for the same 10-year period.

In addition, one more theoretical situation C was estimated: two more restoration measures and estimates of their costs were added to the whole. These measures had not been discussed with the local experts and were thus purely a desktop review. The third situation involved the construction of flood plains (1 hectare in total) and wetlands (1 hectare in total) in the catchment area of Söderhamnså. The cost estimates for these restoration measures were taken from Finnish cases and expert estimates (e.g. the Skanssi Stormwater Plan). With these measures, situation C aimed to reduce the flooding events by further detaining waters in the upper parts of the river basin outside the city. With these cost estimates, the total costs would rise to EUR 0.4 million. None of the investment or maintenance costs are discounted to present value.

Table 6. The estimated total costs of implementing measures for sustainable stormwater management during a ten-year period from 2019–2028

Measures	Costs	
	Total investment costs (€)	Total operation/ Maintenance costs (€)
Permeable surface for parking	60,000	1,100
Rain garden in the centre of the city	16,600	700
Infiltration dams in the upper secondary school yard	29,500	3,000
Green areas surrounding a car park	20,000	1,600
Underground filter in a car park area	30,000	1,450
Infiltration along a main street	10,000	3,250
Total	**166,100**	**11,100**
Total costs A	**€177,200**	
Increasing biodiversity (1 km) *	*€33,000*	
Improving recreation potential (1 km) *	*€4,000*	
Total costs B	**€214,200**	
Flood plains in the upper parts of the river basin (1 ha) **	*€200,000*	
Wetlands in the upper parts of the river basin (1 ha)*	*€10,000*	
Total costs C	**€424,200**	

** Cost estimates from the Helsinki Small Water Programme to complement the scenario presented in the questionnaire*
*** Cost estimates from the Skanssi Stormwater Development Plan*
**** Expert cost estimate of the average costs of wetland construction*

Besides the suggested measures, information campaigns were held for employees in the technical department and Söderhamn Nära (the municipality infrastructure company) to make the stormwater strategy part of their daily work. Many minor measures can be implemented during normal work, such as lifting stones, pavers, along streets and car parks to allow the stormwater to infiltrate in nearby areas. This work would also help to improve the water quality but is not accounted for in the socioeconomic risk reduction mentioned above, although it would most certainly have an effect.

The technical department of the municipality of Söderhamn has an annual budget of EUR 45,000 for cleaning stormwater wells. The building of sustainable stormwater installations would not affect this sum to any great extent. The figure might be slightly lower if stormwater to a greater extent infiltrates green areas or rain gardens, for example. The budget for normal maintenance would be left unchanged.

5.2 The benefit–cost ratios

Neither the costs nor the benefits are discounted to present value. This was an expert judgement made for this study for a number of reasons: i) there is no set timetable for executing the measures; ii) both benefits and costs include considerable uncertainty; iii) in this study, it would be "realistic" to assume that the execution of the measures (costs) and collection of "revenues" (benefits) would be spread out over the duration of this 10 years. For all these reasons, it was concluded that discounting would not significantly improve the accuracy of the estimates in this particular study. The benefit–cost ratio was then tentatively determined by using undiscounted annual estimates of total costs and total benefits.

Residents of Söderhamn were asked about the potential benefits and their willingness to pay for more sustainable stormwater management in Söderhamn and for improving the water quality of Söderhamnså and Söderhamnsfjärden through a survey conducted in the Heawater project. The survey served as an environmental valuation study and the results could be used to quantify the benefits of environmental change. Based on the results, the well-being of Söderhamn residents would increase by about EUR 0.4 million a year if the improvements presented in the survey would take place. This environmental benefit can be compared to estimates of the total cost of the change required. In the previous section, a rough estimate of the total cost was made if the necessary measures were to be executed during the next ten years. Annual environmental benefits and total costs can be compared using a benefit–cost ratio.

Based on the annual benefit and cost estimates for the Heawater project, the environmental benefits of more sustainable stormwater management would outweigh the costs. The benefit–cost ratios are presented in Table 8. The benefits were estimated conservatively, i.e. based on the lowest annual benefit assessment. In the study, the annual benefits remained the same regardless of the length of time for which the measures would be implemented. Regarding the implementation of the measures, the calculation presents annual cost estimates for three, five and ten years. Table 7 also includes all three total cost estimates illustrated in Table 6. In all cases, the benefits are higher than the costs, i.e. the benefit–cost ratio is above 1. In Table 8, only situation B is presented.

Table 7. Benefit–cost ratios for more sustainable stormwater management in Söderhamn based on studies of the Heawater project with different costs and the lower bound benefit estimates

	Euros in total	Annually for 10 years	Annually for 5 years	Annually for 3 years
Total benefits per year	**408,500**	€408,500	€408,500	€408,500
Total costs A	**177,200**	€17,720	€35,440	€59,067
Annual benefit–cost ratio A		**23.1**	**11.5**	**6.9**
Total costs B	**214,200**	€21,420	€42,840	€71,400
Annual benefit–cost ratio B		**19.1**	**9.5**	**5.7**
Total costs C	**424,200**	€42,420	€84,840	€141,400
Annual benefit–cost ratio C		**9.6**	**4.8**	**2.9**

Table 8. Benefit–cost ratios with the costs of situation B and the lower bound benefit estimates

Annual total costs and benefits in situation B	Estimate in euros	Benefit–cost ratio
Annual benefits	408,500	
Annual costs (with a time span of 3 years)	71,400	5.7
Annual costs (with a time span of 5 years)	42,840	9.5
Annual costs (with a time span of 10 years)	21,420	19.1

6. Conclusions

As part of the Heawater project a contingent valuation study was done in Söderhamn to evaluate environmental benefits of more natural stormwater management, reduced flooding in the city are and improving the water quality of the city's most prominent waters; Söderhamnsån and Söderhamnsfjärden.

The survey results showed that most of the respondents thought that the water quality in both Söderhamnsån and Söderhamnsfjärden was not very good. These water ways and their surroundings are still important for respondents' recreation activities and Söderhmansån was important for them.

Respondents were already very well informed about stormwaters, but the pictures and information texts of the survey gave also new information to more than one out of five respondents. Respondents also felt that more natural stormwater management could result positive impacts on Söderhamns attractiveness, quality of their nature experiences and health and mental well-being.

Distribution of women and men corresponded well to both the sample and the population. However, the average age of the respondents was somewhat higher compared to the recipients and the population. Also, the younger age groups chose higher amounts from the available payment amounts than the older age group respondents. These factors were taken into account in the total benefit estimations and most conservative (i.e. lowest) benefit estimations were used in benefit-cost ratio calculations.

Söderhamns municipality has a stormwater strategy which was used in estimating the more natural stormwater management measures and their costs in order to compare these costs with the benefit estimations gathered via the survey. Well over half of the respondents were ready to pay a stormwater fee in order to achieve the benefits described in the surveys willingness to pay scenario. The yearly willingness to pay estimate for the next 10 years was about EUR 0.4 million whereas the costs of the measures included in the estimations were EUR 0.18-0.42 million in total. So, according to this study, the benefits would exceed the costs significantly.

7. References

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Appendix 1. Questionnaire results

n=424

1. How important do you think it is that the following activities are paid for through taxes in Söderhamn?	Very important	Quite important	Neither important nor unnecessary	Quite unnecessary	Very unnecessary	Don't know	empty
a) Recreational activities for all school children	49%	34%	6%	2%	1%	4%	4%
b) Increased access to outdoor recreation, eg discounted rent on archipelago cottages for local residents, more opportunities to get out in the archipelago, expansion of hiking trails	16%	43%	25%	6%	3%	4%	4%
c) Extension of cycle and walkway	33%	41%	12%	4%	3%	3%	3%
d) Free bus trips for young people between 7 and 19 years	33%	33%	15%	7%	3%	5%	4%
e) Improvement of water quality in Söderhamnså	39%	36%	10%	1%	1%	9%	4%
f) Maintenance of the municipal street and road network	72%	23%	1%	0%	0%	1%	3%

2. How do you perceive that the water quality is currently?	in Söderhamnsån	In Söderhamnsfjärden
Excellent	1%	1%
Good	10%	12%
Satisfactory	23%	33%
Passable	25%	17%
Poor	13%	3%
Don't know	26%	32%
empty	1%	2%

3. 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'm worried about the state of Söderhamnsån	16%	35%	31%	3%	4%	10%	2%
b) Södrhamnså is important to me	39%	33%	20%	1%	2%	4%	1%
c) I'm worried about the state of the archipelago	16%	31%	29%	4%	6%	13%	1%

4. Have you used the area around Söderhamnsån and Söderhamnsfjärden during the past 12 months?	Nearly every day	Nearly every week	Every month	Less frequently	Never	Don't know	empty
a) Spent time and socialized along the river	4%	13%	19%	42%	18%	1%	2%
b) Spent time along Söderhamnsfjärden	6%	15%	19%	36%	21%	1%	2%
c) Exercised, walked, cycled, jogged	9%	25%	19%	25%	19%	0%	2%
d) Boat ride, time spent on the water	1%	7%	12%	39%	39%	0%	2%
e) Fished	0%	1%	4%	25%	67%	0%	2%
g) I have not visited the area around Söderhamnsån	7%	9%	7%	30%	13%	8%	26%
h) I have not visited the area around Söderhamnsfjärden	4%	4%	8%	29%	20%	8%	27%

5. Have you been affected by flooding in the last three years in Söderhamn?	
Yes	8%
No	91%
empty	1%

6. Had you heard about stormwater before?	
Yes, I already knew about stormwater	62%
Yes in principle, but the descriptions and images above gave me some new information on the subject	22%
I had heard the term before, but did not really know what it meant	4%
No, I had no knowledge of stormwater	2%
Don't know	2%
empty	9%

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) There is no problem with the quality of the water in Söderhamnsån.	3%	9%	25%	14%	30%	18%	1%
b) There are no problems with flooding around Söderhamnsån.	4%	12%	24%	19%	19%	20%	2%
c) I think that I can influence the status of Söderhamnsån through my actions.	12%	26%	26%	5%	10%	20%	2%
d) It is important to improve the habitats for fish in Söderhamnsån, including trout.	50%	29%	12%	0%	1%	7%	1%
e) In my opinion, the water quality of Söderhamnså has improved over the last year.	8%	19%	38%	4%	6%	24%	1%
f) In my opinion, Söderhamnsån's floods have increased over the last ten years.	5%	14%	39%	5%	7%	28%	1%

8. How would a natural way of handling the stormwater, as described above, affect you?	No impact	Minor positive impact	Moderately positive impact	Major positive impact	Don't know	empty
a) I would make more visits to Söderhamnsån and Söderhamn's green areas	10%	14%	25%	26%	23%	2%
b) The quality of the natural experience would be improved	4%	12%	27%	38%	18%	1%
c) Mental well-being and health would increase	7%	14%	23%	34%	22%	1%
d) Söderhamn's attractiveness would increase	5%	9%	22%	45%	18%	1%

9. Would you be willing to pay a stormwater fee in the years 2019-2028?	
Yes	20%
Maybe	38%
No	41%
empty	1%

10. How much would you be willing to pay the stormwater fee?						
	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
10 SEK/month	38%	19%	2%	2%	6%	33%
20 SEK/month	29%	16%	4%	2%	7%	42%
50 SEK/month	14%	15%	8%	5%	11%	48%
100 SEK/month	6%	8%	8%	8%	15%	55%
150 SEK/month	3%	3%	10%	9%	18%	57%
200 SEK/month	2%	2%	8%	8%	22%	58%
more than 200 SEK/month?	0%	0%	4%	6%	25%	65%

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	empty
a) I want to improve the status of Söderhamnsån because I use the surroundings around the river for recreation.	14%	29%	6%	1%	16%	33%
b) I want to improve the status on Söderhamnsån even though I do not use the surroundings around the river for recreation.	19%	32%	3%	2%	11%	34%
c) I want to get a greener city	31%	29%	3%	1%	5%	32%
d) I support more natural ways of managing stormwater to reduce the risk of flooding.	29%	27%	2%	0%	8%	33%
e) I want to improve the natural life in and around Söderhamnsån.	32%	26%	2%	1%	7%	32%
f) I want more visible water in the city center instead of underground stormwater pipes.	20%	23%	8%	2%	16%	32%
g) Other reason (specify):	2%	0%	0%	0%	17%	80%

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	empty
a) I cannot afford to pay to improve the quality of Söderhamnsån.	11%	10%	15%	10%	17%	37%
b) The Söderhamnsån does not need any more measures to protect against flooding or purification of the water.	5%	12%	9%	10%	28%	37%
c) Improvements and flood protection must be paid through the tax bill.	16%	17%	8%	6%	21%	33%
d) Other reason:	2%	1%	0%	2%	17%	78%

13. In your opinion, what would be the best way to collect revenue from citizens?	
Through a voluntary "stormwater allowance"	17%
By raising the VA tariff	28%
Through a tax increase	20%
None of the above	24%
Empty	12%

14. Have you done something to improve the state of the Söderhamnsån in the last three years?				
	Yes	No	Don't know	empty
a) Participated in some type of volunteer work to restore Söderhamnsån for example collected trash.	5%	87%	3%	5%
b) Always throw away garbage in designated trash	95%	3%	1%	1%
c) Washed the car environmentally friendly	76%	6%	12%	6%
d) Used environmentally friendly fuel in motorboats.	20%	24%	36%	20%
e) Other, specify what	4%	3%	17%	75%

15. Gender	
Female	48%
Male	50%
Other	0%
empty	2%

16. Age	
Under 20 years	0%
20-29 years	3%
30-39 years	6%
40-49 years	8%
50-59 years	16%
60-69 years	21%
70-79 years	27%
80 years tai yli	14%
empty	4%

17. Families with children	
Families with children	17%
No children	83%
empty	0%

18. What type of residence do you live in?	
Detached house	55%
Semi-detached or terraced house	9%
Apartment building	31%
Other	1%
empty	4%

19. Postal code					
82600	0%	82636	5%	82660	0%
82630	5%	82637	9%	82670	13%
82631	10%	82639	10%	82691	0%
82632	8%	82640	3%	82692	4%
82634	2%	82650	14%	82693	0%
82635	4%	82636	12%	82695	0%
Empty	1%				

20. How long have you lived in Söderhamn?	
Less than a year	0%
1- 4 years	2%
5-9 years	4%
10-19 years	8%
20-29 years	14%
30-39 years	14%
40-49 years	14%
50 years or more	40%
empty	0%

21. What is your level of education?	
Basic school education	19%
Gymnasium	28%
Vocational training	24%
University degree/College graduate	26%
Licentiate or doctoral degree	1%
Other	2%
empty	4%

22. Which of the following groups do you feel you belong to?	
Interested in water and nature through my occupation	9%
Interested in water and nature through hobby (hunting, mushroom or berry picking, sport fishing)	46%
Visiting nature for relaxation	68%
Activities in nature such as cycling, running, kayaking	37%
Member of association working for nature conservation such as the Nature Conservation Association	8%
Other, specify:	6%
None of the above	10%

23. What was your household's total pre-tax income per month for 2018?	
Less than 10 000 SEK/month	8%
10 000–19999 SEK/month	34%
20 000–29999 SEK/month	23%
30 000–39 999 SEK/month	16%
40 000–49 999 SEK/month	7%
50 000–59 999 SEK/month	4%
60 000–69 999 SEK/month	1%
70 000 SEK/month or more	1%
Empty	7%

24. Please assess which of the following statements are true				
	Fully	Partially	Not at all	empty
24a) The questionnaire gave me new information about Söderhamnsån.	25%	59%	13%	3%
24b) The questionnaire gave me new information about stormwater.	24%	51%	23%	2%
24c) I am more concerned about the status of Söderhamnsån after answering the questionnaire than before.	13%	50%	31%	5%
24d) It was difficult for me to determine how much my household is willing to pay as a "stormwater fee".	25%	41%	29%	4%
24e) I agree that it would be a good idea to raise money through a "stormwater fee".	16%	32%	48%	4%
24f) I will be more interested in Söderhamnsån and stormwater in the future.	22%	53%	21%	4%
24g) I read the info sheet that came with the questionnaire.	54%	31%	6%	8%

25.	
a) How interesting do you think the subject of the questionnaire is? (1-5)	3,6
b) How would you rate this survey? (1-5)	3,1

Appendix 2. Questionnaire

Åsikter om översvämning och vattenkvalitet i Söderhamn

Enkät för
1200 invånare
i Söderhamn

SÖDER HAMN!

SYKE

heaWater
PIDÄ LÄHIVEDET KUNNOSSA

Interreg
Central Baltic

EUROPEAN UNION
European Regional Development Fund

Vi är intresserade av din åsikt angående tillståndet hos Söderhamnsån. Det finns inget rätt eller fel svar på frågorna, alla synpunkter är intressanta. Ditt namn kommer inte att kunna kopplas ihop med något specifikt svar. Alla svar kommer att behandlas konfidentiellt.

1 Hur viktigt tycker du det är att följande aktiviteter betalas via skatter i Söderhamn?

▶*Markera ett svarsalternativ per rad.*

	Mycket viktigt	Ganska viktigt	Inte viktigt eller onödigt	Ganska onödigt	Helt onödigt	Vet inte
a) Fritidsverksamhet för alla skolbarn	☐	☐	☐	☐	☐	☐
b) Ökad tillgång till frilufstliv t ex rabatterad stughyra på skärgårdsstugor för kommuninnevånare, fler möjligheter att ta sig ut i skärgården, utbyggnad av vandringsleder	☐	☐	☐	☐	☐	☐
c) Utbyggnad av och cykel- och gångbanor	☐	☐	☐	☐	☐	☐
d) Fria bussresor för ungdomar mellan 7 och 19 år	☐	☐	☐	☐	☐	☐
e) Förbättring av vattenkvaliteten i Söderhamnsån	☐	☐	☐	☐	☐	☐
f) Underhåll av det kommunala gatu- och vägnätet	☐	☐	☐	☐	☐	☐

Karta över Söderhamnsåns avrinningsområde.

BESKRIVNING AV SÖDERHAMNSÅN

Söderhamn som stad har växt fram längs Söderhamnsån och ån har genom tiderna haft en stor betydelse för staden som hamnplats, för transport, fiske och handel. Den är också viktig för både rekreation och umgänge. Söderhamnsån sträcker sig cirka 20 km från källan vid Stora Öratjärn öster om Glössbo till utloppet i Söderhamnsfjärden. Den får sitt vatten från ett område som är 92,3 km². Söderhamnsån rinner genom både skogsmark, jordbruksmark och bebyggt område. Utmärkande för ån är att den rinner genom ett mestadels flackt landskap och har få sjöar längs sitt flöde. Det gör att den vid kraftiga regn och vid snösmältning lätt orsakar översvämning då flödet ökar kraftigt eftersom det är få sjöar som kan dämpa flödet.

Hamnbron är gränsen mellan Söderhamnsån och Söderhamnsfjärden.

Bild: Sari Väisänen.

Bild: Ljudmila Vesikko.

2 Hur uppfattar du att vattenkvaliteten är i dagsläget:

▶Markera ett svarsalternativ per rad.

	Utmärkt	Bra	Tillfredsställande	Mindre bra	Dålig	Vet ej
a) hos Söderhamnsån?	☐	☐	☐	☐	☐	☐
b) hos Söderhamnsfjärden?	☐	☐	☐	☐	☐	☐

c) Motivera ditt svar: _____

_____

_____

3 Hur ställer du dig till följande påståenden?

▶Markera ett svarsalternativ per rad.

	Instämmer helt	Instämmer delvis	Ingen uppfattning	Delvis oense	Håller inte alls med	Vet inte
a) Jag är bekymrad över Söderhamnsåns tillstånd	☐	☐	☐	☐	☐	☐
b) Söderhamnsån är viktig för mig	☐	☐	☐	☐	☐	☐
c) Jag är bekymrad över tillståndet i skärgården	☐	☐	☐	☐	☐	☐

4 Har du använt området kring Söderhamnsån och Söderhamnsfjärden under de senaste 12 månaderna? I så fall hur?

▶*Markera ett svarsalternativ per rad.*

	Varje dag	Varje vecka	Varje månad	Mer sällan	Aldrig	Vet inte
a) Tillbringat tid och umgåtts längs ån	☐	☐	☐	☐	☐	☐
b) Tillbringat tid längs Söderhamnsfjärden	☐	☐	☐	☐	☐	☐
c) Motionerat, promenerat, cyklat, joggat	☐	☐	☐	☐	☐	☐
d) Åkt båt, spenderat tid på vattnet	☐	☐	☐	☐	☐	☐
e) Fiskat	☐	☐	☐	☐	☐	☐
f) Annat (specificera): _____	☐	☐	☐	☐	☐	☐
g) Jag har inte besökt området kring Söderhamnsån	☐	☐	☐	☐	☐	☐
h) Jag har inte besökt området kring Söderhamnsfjärden	☐	☐	☐	☐	☐	☐

5 Har du drabbats av översvämning under den senaste treårsperioden i Söderhamn?

☐ Ja ☐ Nej

Om du drabbats av översvämning, hur påverkade den dig?

_____

_____

_____

_____

VATTENKVALITETEN I SÖDERHAMNSÅN OCH SÖDERHAMNSFJÄRDEN

Söderhamn är en gammal stad, firar 400-årsjubileum 2020, och både Söderhamnsån och Söderhamnsfjärden är påverkad av staden och dess tidigare verksamheter kring den. Problemet för Söderhamnsån är att näringsämnen och fina jordpartiklar spolas med när flödet blir högt. Det leder till att både Söderhamnsån och Söderhamnsfjärden blir övergödda. Ett annat problem är de miljöfarliga ämnen som spolas med dagvattnet ut i ån och fjärden. Söderhamnsfjärden är extra känslig för miljöpåverkan eftersom den är både långsmal och grund.

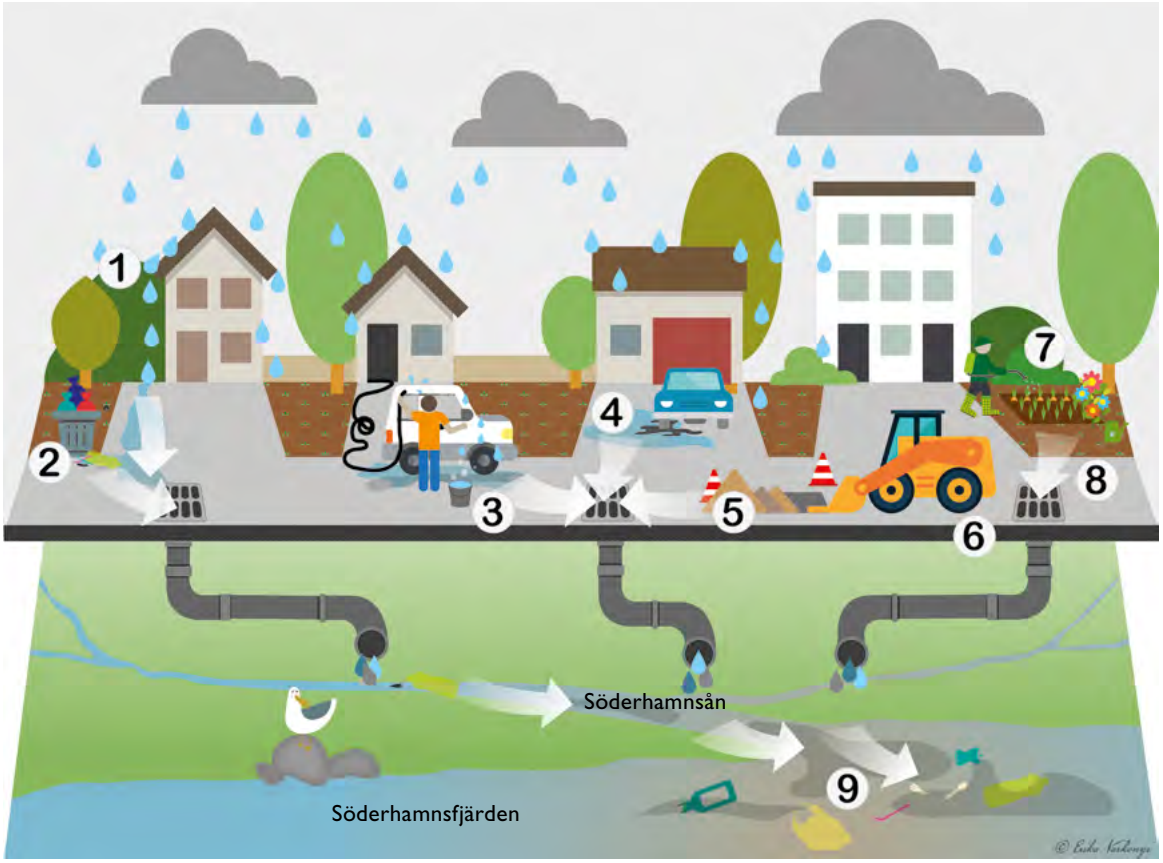
Vattenkvaliteten i Söderhamn har undersökts sedan 1970-talet. Under 2018 gjordes en större kartläggning av Söderhamnsåns vattenstatus. Enligt de senaste klassningarna i VISS (VISS - VattenInformationsSystem Sverige är en databas som har utvecklats av vattenmyndigheterna, länsstyrelserna och Havs och vattenmyndigheten) har Söderhamnsfjärden en otillfredsställande ekologisk status och Söderhamnsån måttlig ekologisk status. Den biologiska statusen för fisk i rinnande vatten har bedömningen måttlig även om det förekommer reproduktion av öring.

VAD ÄR DAGVATTEN?

Dagvatten är tillfälligt förekommande regn- och smältvatten från exploaterade områden som når vattendrag eller reningsverk via hårdgjorda ytor (hustak, gator, parkeringsplatser med mera), genomsläpplig mark, diken och/eller VA-ledningar.

Dagens tätorter består till stor del av hårdgjorda ytor. Där har de naturliga avrinningsvägarna i stor utsträckning ersatts av tekniska dagvattensystem i form av ledningar. Dessa förändringar ger dagvattnet en snabb avrinning som medför en minskad fastläggning av föroreningar. Föroreningar förs till och belastar då närliggande vattendrag. När fler ytor bebyggs innebär det att ännu mer dagvatten förs till närliggande vattenförekomster. Dessutom förutspås en ökad mängd dagvatten som en följd av klimatförändringar och ökad nederbörd. Även detta kan innebära en ökad tillförsel av föroreningar till åar, sjöar och kustnära vatten samt att risken för översvämning ökar om dagvattenledningarna inte hinner transportera bort den ökade vattenmängden.

Exempel på hur dagvattenbildas och hur det påverkas av mänsklig aktivitet



Bilden visar exempel på ämnen som följer med dagvattnet ut i åar och vattendrag.

1. Koppar, bly och andra miljöfarliga ämnen löses ut från tak
2. Skräp från sopkorgar och gator
3. Rengöringsmedel från biltvätt
4. Läckande olja, partiklar från däck med mera från fordon
5. Vägsalt från gator
6. Jord och slam från byggen
7. Bekämpningsmedel och näring från trädgårdar och parker
8. Dagvattnet förs från ledningar till reningsverk eller direkt ut i vattendrag
9. Skräp och miljöfarliga ämnen följer också med vattendrag ut i havet

6 Har du hört talas om dagvatten tidigare?

▶*Markera ett svarsalternativ.*

☐ Ja, jag visste sedan tidigare vad dagvatten är
☐ Jag hade en begränsad kunskap om vad dagvatten är men beskrivningen och bilderna gav mig mer information
☐ Jag har hört ordet tidigare men visste inte vad det betydde
☐ Jag visste inte vad dagvatten var
☐ Jag vet inte

HUR KAN DAGVATTEN HANTERAS?

Det bästa sättet att ta hand om dagvatten är att förhindra att det bildas, genom att ta hand om det lokalt med småskaliga lösningar. Öppna gröna ytor bidrar till fördröjning och rening av dagvattnet samtidigt som belastningen på VA-systemet minskar och därigenom minskar även risken för översvämningar. Effekten blir en mer robust och klimatanpassad dagvattenhantering, som samtidigt bidrar till förbättrad vattenkvalitet i Söderhamnsån och Söderhamnsfjärden och är resurs- och värdeskapande.

Det finns många lösningar som kan användas för att ta hand om vattnet lokalt. Växtbäddar eller regngårdar fördröjer och infiltrerar dagvattnet och bidrar samtidigt till bättre vattenkvalitet. Anläggningar som konstruerade våtmarker och växtbeklädda svackdiken ger också en förbättrad vattenkvalitet. För att minska flödestoppar kan växtbeklädda fördröjningsmagasin eller dammar användas. Andra exempel på lokala lösningar är gröna tak, genomsläpplig beläggning och trädplantering.

Bild: Söderhamn Nära.

Bild: Åbo stad.

7 Hur ställer du dig till följande påståenden?

▶*Markera ett svarsalternativ per rad.*

	Instämmer helt	Instämmer delvis	Ingen uppfattning	Delvis oense	Håller inte alls med	Vet inte
a) Det finns inga problem med kvaliteten på vattnet i Söderhamnsån.	☐	☐	☐	☐	☐	☐
b) Det finns inga problem med översvämning kring Söderhamnsån.	☐	☐	☐	☐	☐	☐
c) Jag tror att jag kan påverka statusen hos Söderhamnsån genom mina handlingar.	☐	☐	☐	☐	☐	☐
d) Det är viktigt att förbättra livsmiljöerna för fisk i Söderhamnsån, bland annat för öring.	☐	☐	☐	☐	☐	☐
e) Enligt min åsikt har vattenkvaliteten i Söderhamnsån förbättrats under de senaste åren.	☐	☐	☐	☐	☐	☐
f) Enligt min åsikt har Söderhamnsåns översvämningar ökat under de senaste tio åren.	☐	☐	☐	☐	☐	☐

DET FINNS FÖRDELAR MED ATT TA HAND OM DAGVATTNEN DÄR DET BILDAS

En traditionell stadsmiljö består till stor del av hårdgjorda ytor. I sådana miljöer har det naturliga avrinningsvägarna, som ger fördröjning och infiltration, i stor utstäckning ersatts av tekniska dagvattensystem i form av ledningar. Det ger dagvattnet en mycket snabb avrinning. Den snabba avrinningen medför en minskad fastläggning av föroreningar, och att föroreningarna istället förs till och belastar närliggande vattendrag som, Söderhamnsån och Söderhamnsfjärden.

Genom att ge utrymme åt dagvatten nära dess uppkomst och efterlikna en naturlig avrinning erhålls en rad fördelar ur ett hållbarhetsperspektiv. Några exempel är fastläggning av föroreningar, grundvattennivån upprätthålls och ett system som blir mindre känslig för varierad nederbörd. Andra fördelar är det blir fler och varierade grönområden vilket bidrar positivt till den biologiska mångfalden, möjligheten till rekreation ökar och en estetiskt tilltalande miljö skapas.

Exempel på ett konventionell sätt att ta hand om dagvatten.

Exempel på ett naturligt sätt att ta hand om dagvatten.

8 Hur skulle ett naturligt sätt att ta hand om dagvattnet, som det beskrivs ovan, påverka dig?

▶ *Markera ett svarsalternativ per rad.*

	Ingen effekt	Liten positiv effekt	Medelstor positiv effekt	Stor positiv effekt	Vet ej
a) Jag skulle göra fler besök till Söderhamnsån och Söderhamns grönområden	☐	☐	☐	☐	☐
b) Kvaliteten på naturupplevelsen förbättras	☐	☐	☐	☐	☐
c) Det mentala välbefinnandet och hälsan öka	☐	☐	☐	☐	☐
d) Söderhamns attraktivitet öka	☐	☐	☐	☐	☐

EXTRA PENGAR BEHÖVS

Söderhamns Kommun har antagit en dagvattenstrategi. Den syftar till att utveckla kommunens dagvattenhantering mot en mer hållbar inriktning. Strategin fokuserar på vattenkvalitet men vill också visa hur dagvatten kan nyttiggöras och hantera utmaningar i som uppstår genom klimatförändringar och när stadsmiljöer bebyggs allt tätare.

För att kunna uppnå en hållbar dagvattenhantering behövs mer pengar. Föreställ er nu att innevånarna i Söderhamn skulle betala en dagvattenavgift på den ordinarie VA-taxan under de närmaste tio åren för att förändra dagvattenhanteringen så att den blir mer naturlig. Dessa åtgärder skulle leda till att:

- Risken för översvämning minskar längs åarna och i centrala Söderhamn
- Kvaliteten på vattnet förbättras i Söderhamnsån och Söderhamnsfjärden
- Fler och mer varierade livsmiljöer för djur- och växtliv skapas i Söderhamnsån och stadsmiljön
- Fler platser för rekreation och umgänge skapas

Bild: Ingela Granlund.

9 Skulle du vara villig att betala en dagvattenavgift under åren 2019–2028?

▶Välj ett svarsalternativ.

☐ Ja ☐ Kanske ☐ Nej *▶Gå direkt till fråga 12.*

10 Hur mycket skulle du vara villig att betala i dagvattenavgift?

▶För varje summa, bocka i hur villig du skulle vara att betala eller inte. Tänk på att summan skulle vara skild från dina övriga utgifter.

Månadsavgift under de närmsta tio åren	Jag skulle absolut betala	Jag skulle kunna tänka mig att betala	Jag vet inte om jag skulle betala	Jag skulle troligen inte betala	Jag skulle absolut inte betala
10 kr/månad	☐	☐	☐	☐	☐
20 kr/månad	☐	☐	☐	☐	☐
50 kr/månad	☐	☐	☐	☐	☐
100 kr/månad	☐	☐	☐	☐	☐
150 kr/månad	☐	☐	☐	☐	☐
200 kr/månad	☐	☐	☐	☐	☐
Skulle du kunna tänka dig att betala mer än 200 kr/månad? I så fall hur mycket? _____	☐	☐	☐	☐	☐

11 Vilka anledningar är viktigast för din vilja att betala?

▶Markera ett svarsalternativ per rad. Efter du har svarat på den här frågan, du kan gå direkt till fråga 13.

	Mycket viktig	Ganska viktig	Ganska onödig	Mycket onödig	Vet ej
a) Jag vill förbättra statusen på Söderhamnsån eftersom jag använder omgivningarna kring ån för rekreation.	☐	☐	☐	☐	☐
b) Jag vill förbättra statusen på Söderhamnsån även om jag inte använder omgivningarna kring ån för rekreation.	☐	☐	☐	☐	☐
c) Jag vill få en grönare stad.	☐	☐	☐	☐	☐
d) Jag stöder mer naturliga sätt att hantera dagvatten för att minska översvämningsrisken.	☐	☐	☐	☐	☐
e) Jag vill förbättra naturlivet i och kring Söderhamnsån.	☐	☐	☐	☐	☐
f) Jag vill ha mer synligt vatten i centrum istället för underjordiska dagvattenledningar.	☐	☐	☐	☐	☐
g) Annan anledning (specificera): _____	☐	☐	☐	☐	☐

▶Du kan gå direkt till fråga 13.

Bild: Ingela Granlund.

12 Personer kan ha olika anledningar till varför de inte vill betala för att förbättra vatten statusen på Söderhamnsån. Hur viktiga är följande anledningar för dig till att inte betala för att förbättra vattenkvaliteten och den biologiska mångfalden?

▶Markera ett svarsalternativ per rad.

	Mycket viktig	Ganska viktig	Ganska likgiltig	Mycket likgiltig	Vet ej
a) Jag har inte råd att betala för att förbättra kvaliteten på Söderhamnsån.	☐	☐	☐	☐	☐
b) Söderhamnsån behöver inte fler åtgärder för skydd mot översvämning eller rening av vattnet.	☐	☐	☐	☐	☐
c) Förbättringar och skydd mot översvämning ska betalas via skattsedeln.	☐	☐	☐	☐	☐
d) Annan anledning (specificera): _____	☐	☐	☐	☐	☐

13 Vilket sätt skulle, enligt dig, vara det bästa sättet att få pengar till åtgärder som förbättrar dagvattenhanteringen och därigenom minskar risken för översvämningar och förbättrar vattenkvaliteten?

▶Välj ett svarsalternativ.

☐ Genom ett frivilligt ”dagvattenpeng”

☐ Genom en höjning av VA-taxan

☐ Genom en skattehöjning

☐ Ingendera

Bild: Ingemar Olofsson.

14 Har du gjort något för att förbättra Söderhamnsån under de senaste tre åren?

▶Välj ett svarsalternativ.

	Ja	Nej	Vet inte
a) Deltagit i någon typ av volontärarbete för att restaurera Söderhamnsån t ex samlat skräp.	☐	☐	☐
b) Alltid slängt skräp i avsedda papperskorgar.	☐	☐	☐
c) Tvättat bilen miljövänligt.	☐	☐	☐
d) Använt miljövänligt bränsle i båtmotorer.	☐	☐	☐
e) Annat, specificera vad: _____	☐	☐	☐

För att kunna beskriva den typiske innevånarens attityder behöver vi lite bakgrundsinformation från varje person som svarar. Informationen är helt konfidentiell – det kommer inte att gå att koppla dina eller någon annans svar till det publicerade materialet.

Var vänlig och besvara också följande frågor, så att vi kan dra nytta av din svar i vår forskning!

15 Kön?

☐ Kvinna ☐ Man ☐ Annat/Ingen kommentar

16 Födelseår? _____

17 Storlek på hushållet, dig inräknat _____ vuxna och _____ barn

18 Bostadsförhållande?

☐ Enskild villa ☐ Radhus ☐ Lägenhet ☐ Annat (specificera) _____

19 Vilket postnummer har du? _____

20 Hur länge har du bott i Söderhamn ? Ca _____ år

21 Utbildningsnivå?

☐ Grundskola
☐ Gymnasium
☐ Yrkesutbildning
☐ Examen från Högskola/Universitet
☐ Licentiat/Doktorsexamen
☐ Annat, specificera _____

22 Till vilken av dessa grupper skulle du räkna dig själv?

▶*Du kan välja flera svarsalternativ.*

☐ Intresserad av vatten och natur genom mitt yrke
☐ Intresserad av vatten och natur genom hobby (jägare, svamp- eller bärplockare, sportfiske)
☐ Besöker naturen för avkoppling
☐ Aktiviteter i naturen som cykling, löpning, kajak
☐ Medlem i förening som arbetar för naturskydd som t ex Naturskyddsföreningen
☐ Annat, specificera: _____
☐ Inget av ovanstående

23 Din inkomst före skatt per månad 2018?

☐ Mindre än 10 000 kr/månad
☐ 10 000–19999 kr/månad
☐ 20 000–29999 kr/månad
☐ 30 000–39 999 kr/månad
☐ 40 000–49 999 kr/månad
☐ 50 000–59 999 kr/månad
☐ 60 000–69 999 kr/månad
☐ 70 000 kr eller mer

24 Markera vilka av följande påståenden som stämmer.

▶*Markera endast ett svarsalternativ för varje rad.*

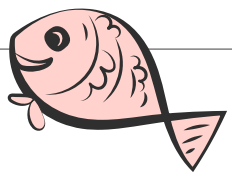
	Instämmer helt	Instämmer delvis	Håller inte alls med
a) Frågeformuläret gav mig ny information om Söderhamnsån.	☐	☐	☐
b) Frågeformuläret gav mig ny information om dagvatten.	☐	☐	☐
c) Jag är mer bekymrad över statusen hos Söderhamnsån efter att ha svarat på frågeformuläret än tidigare.	☐	☐	☐
d) Det var svårt för mig att avgöra hur mycket mitt hushåll är villiga att betala i ”dagvattenavgift”.	☐	☐	☐
e) Jag håller med om att det vore en bra idé att samla in pengar genom en ”dagvattenavgift”.	☐	☐	☐
f) Jag kommer att vara mer intresserad av Söderhamnsån och dagvatten i framtiden.	☐	☐	☐
g) Jag läste infobladet som följde med enkäten.	☐	☐	☐

25 a) Hur intressant tycker du att ämnet för frågeformuläret är? (1–5) _____

b) Hur skulle du betygssätta den här undersökningen? (1–5) _____

Har du några ytterligare synpunkter, angående Söderhamnsån och dess vattenkvalitet samt hur dagvattenhanteringen ska fungera, notera det i fältet nedan.

Tack för ditt deltagande!



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Finlands miljöcentral SYKE 2019.
Layout: Erika Várkonyi. Pärmbild: Ljudmila Vesikko. Tryckning: JP Postitus.