HEAWATER

Cleaner urban rivers for a cleaner Baltic Sea

Interreg Central Baltic

EUROPEAN UNION
European Regional Development Fund

heaWater

Introduction

The Baltic Sea catchment area in facts:

- **Surrounded by 14 countries**
- **Over 85 million inhabitants**
- **250 rivers run into the Baltic Sea**

Since many of the rivers run through urban areas, human activity is a major threat to the marine environment and its biodiversity.

While in the past urban waterways were treated as sewers, the past half century has seen an evolution in our thinking. Nowadays urban rivers have an essential role in increasing the diversity of habitats, urban landscapes and recreation possibilities.

However, stormwater still drains into these rivers, which is why sustainable management of stormwater is of key importance for healthy urban rivers and, in turn, for protecting the Baltic Sea.

The Heawater Project works to improve the water quality of small urban rivers with the ultimate aim of a healthier Baltic Sea.

The project Heawater aims at:

- Implementing water quality improvement techniques on urban rivers in Finland, Sweden and Estonia
- Assessing citizens' willingness to pay for improved state of urban small rivers
- Showing people the monetary value of improving urban rivers (social cost-benefit analysis)
- Compiling a tool (decision support tool) that helps coastal municipalities to plan the improvement of their urban rivers
- Raising awareness about the benefits of improving water quality in small rivers and the effect on citizens' wellbeing.

Improvements in Tallinn

Background: The River Mustjõgi is one of Tallinn's 16 rivers. Nowadays, only the last 1,3 km of the riverbed is visible before it enters the Baltic Sea. It has been altered for centuries and even used as a sewage drain.

Problem: Bank erosion, which leads to flooding, and accumulated deposits from low maintenance of the river. This causes low water-carrying capacity and the release of phosphorus from the deposits.

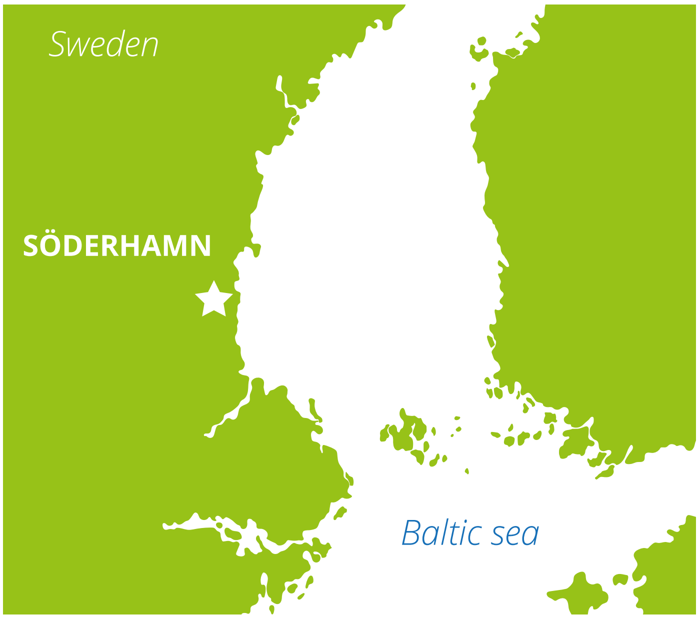
Solution: A total of 610 meters of bank protection was built, the Ojaveere Street culvert was reconstructed, and sediments were removed from the bottom of the river. These works decreased the phosphorus content in the water and helped mitigate flooding risk.

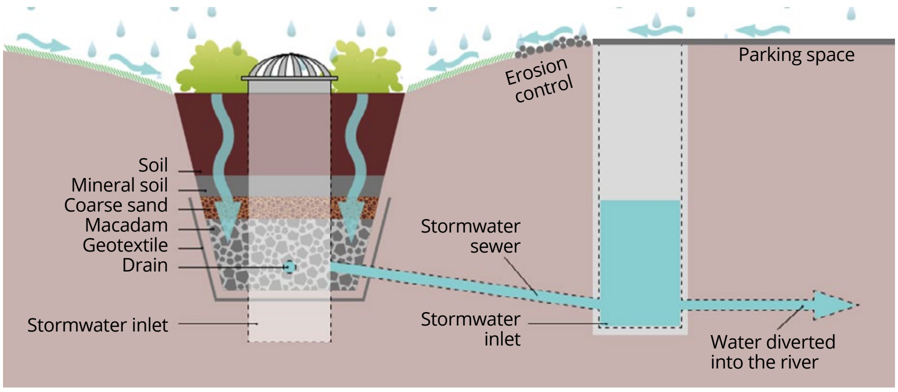
Improvements in Söderhamn

Background: The Söderhamn River ends in the narrow Bay of Söderhamn and finally in the Baltic Sea. It is highly affected by human activity. During floods, the water level quickly rises and the peak flow can be up to 200 times the normal flow in the river.

Problem: High amount of suspended matter and nutrients in the water, mainly phosphorous, which leads to overfertilisation in the river and the Bay of Söderhamn.

Samples of stormwater from the city show high concentrations of zinc and copper. There is also a large number of SBP-particles, mostly rubber particles, from tires and streets.





Solution: A raingarden and a vegetated detention pond slow the stormwater down and act like filters.

The Heawater works are in the centre of Söderhamn, where the raingarden was built in a parking lot. The area is a low point that frequently gets flooded during heavy rains, and it collects water from two of Söderhamn's busiest streets.

The central location in Söderhamn also presents an opportunity for raising awareness about stormwater.

Improvements in Turku

Background: Small streams and ditches in Turku collect rainwater and convey it from the urban areas to the bigger rivers and eventually the Baltic Sea. They also provide habitats for animal and plant species, have a positive effect on urban climate during summers, and have recreational value.

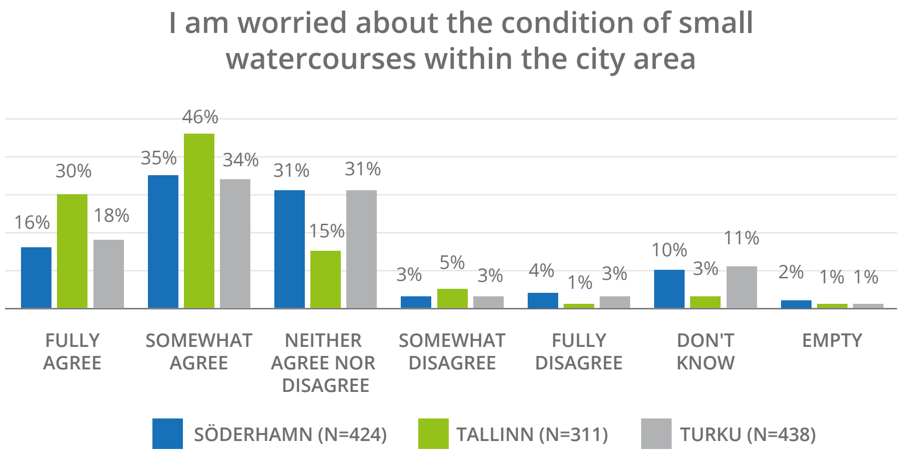
Problem: The smaller streams and their tributaries are heavily affected by pollutants carried by rain runoff, such as heavy metals and nutrients from traffic, buildings, and commercial and domestic activities.

Solution: A filter solution that can be placed in small streams to retain small particles from their waters. Since many pollutants adsorb to the surface of these particles, these are removed as well.

The filter can be adjusted to various flow and pollution conditions. It is filled with a granulate made of natural clay and is easy to handle during maintenance work. The tested prototypes have proven to be effective especially for smaller water volumes and maybe adapted for use, for instance, to treat runoff water from large parking areas.

Environmental valuation surveys and cost-benefit analysis

Figure 1



From 2018 to 2020, studies were conducted in Turku, Söderhamn and Tallinn to find out more about people's willingness to pay for a given environmental change.

With the surveys, nearly 5,000 citizens also received information about their local small rivers and stormwater, as well as natural solutions for their management.

Results:

- 9 out of 10 respondents said they received new information about their local small rivers
- 3 out of 4 received new information about stormwater
- Over half were concerned about the rivers in their area
- 1 out of 3 believed they can do something to influence the condition of the rivers
- Over 80% said they would pay more attention to the state of urban rivers in the future.

The state of small rivers was different in all three areas, so the results and cost-benefit estimations should not be compared directly. However, the willingness to participate in improving the state of the local small rivers was high in all three areas.

What's more – in all three studies, the **benefits exceeded the costs of the measures** planned to improve the state of the small urban rivers *(Figure 2)*.

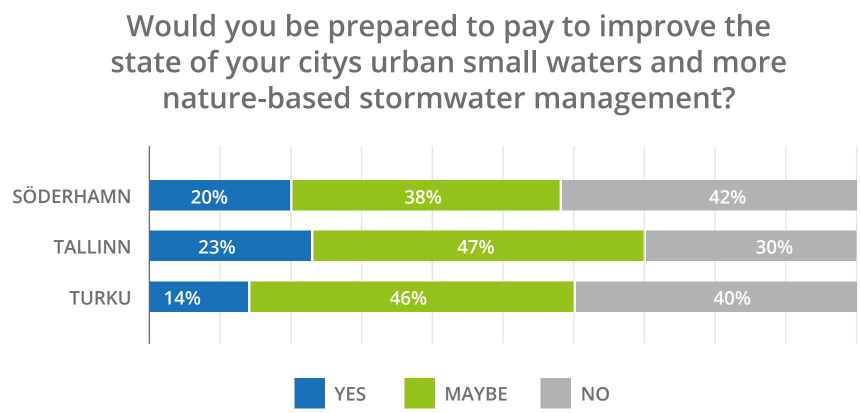


Figure 2

Decision support tool (DST)

The decision support tool (DST) was developed to support planners, decision makers and private actors looking for the best urban river restoration methods.

The tool provides:

- A database of established measures for stream restoration and habitat preservation
- Technical and regulatory solutions for sustainable stormwater management.

River restoration methods together sustainable stormwater management give the best results to preserve urban rivers.

The solutions are adapted to the climate of the Central Baltic region and for each, you can see the primary and secondary functions. The aim of the solutions is also to support the natural hydrologic cycle and maximise benefits, such as providing habitats and regulating the urban climate.

The non-technical solutions in the DST include regulatory means such as:

- Stormwater discharge fees or taxes
- Building acts and laws
- Campaigns for awareness and education
- Community projects, etc.

The restoration of degraded rivers and ecosystems requires effort on all fronts – regulations, authorities and citizens, and the DST presents the most effective and successful examples.

The DST is an easy-to-use spreadsheet-based tool that can be easily shared, maintained and applied by experts and non-experts alike.

Project results

The main aim of the project was to reduce phosphorus, nitrogen, micro and macro litter and suspended solids from pilot river water by **10%**. It turned out that the works **improved the water quality even more effectively:**

- In Tallinn, the suspended solids and total phosphorus concentrations decreased **50%** *(Figure 3 and 4)*
- In Söderhamn, the suspended solids and total phosphorus concentrations decreased over **50%** *(Figure 3 and 4)*
- In Turku, the average reduction of suspended solids was **69%** *(Figure 3).*

Figure 3

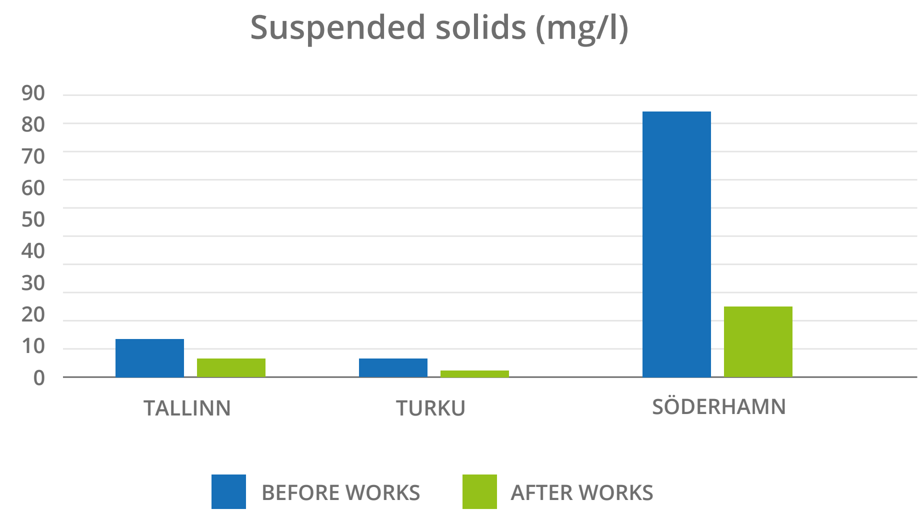
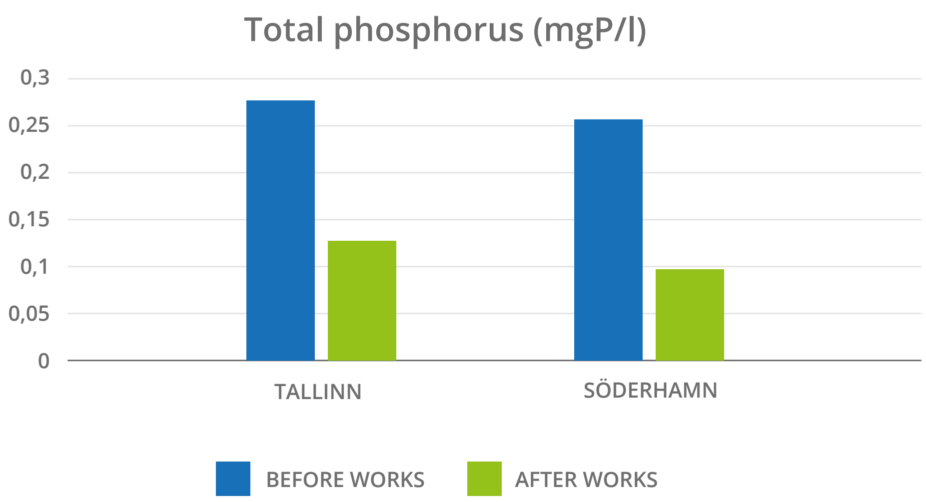


Figure 4



The project was a joint cooperation venture between:

Estonia

- Tallinn Urban Environment and Public Works Department
- Tallinn University of Technology

Finland

- Finnish Environment Institute
- Turku University of Applied Sciences
- John Nurminen Foundation
- City of Turku

Sweden

- The Municipality of Söderhamn

Project duration: March 2018–February 2021

The project was financed with 1 898 348 euros from the European Regional Development Fund

www.tallinn.ee/heawater