

LIFE-Goodstream

After-LIFE communication &
monitoring plan



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The project LIFE-Goodstream

Between 2015 and 2023, the project LIFE-Goodstream has been working to improve the ecological status of Trönningeån, an agricultural stream in Halland, southwest Sweden. The stream had high nutrient loading, poor fish migration possibilities, recurring floods, and low biological diversity.

Within the project, measures were implemented both in the stream and on land within the Trönningeån drainage area, in collaboration with the landowners. The project was based on a holistic concept focusing on multifunctional measures (such as wetlands, integrated buffer zones, urban stormwater ponds, removal of migration barriers, and increase of the stream beds' cross-sectional area) and additional biodiversity measures (amphibian ponds, and other creotopes, bird and insect nest boxes, etc.). In addition to the strong commitment from landowners, the general public, water councils, a village association, schools, and university students were also involved in the project. Furthermore, synergies with other environmental and research projects were established, enabling comprehensive investigations into aspects such as water flow, wetland buffering capacity, and impact on biological diversity such as aquatic insects and bees. Surveys of dragonflies, birds, amphibians, mammals, and aquatic vegetation were also conducted.

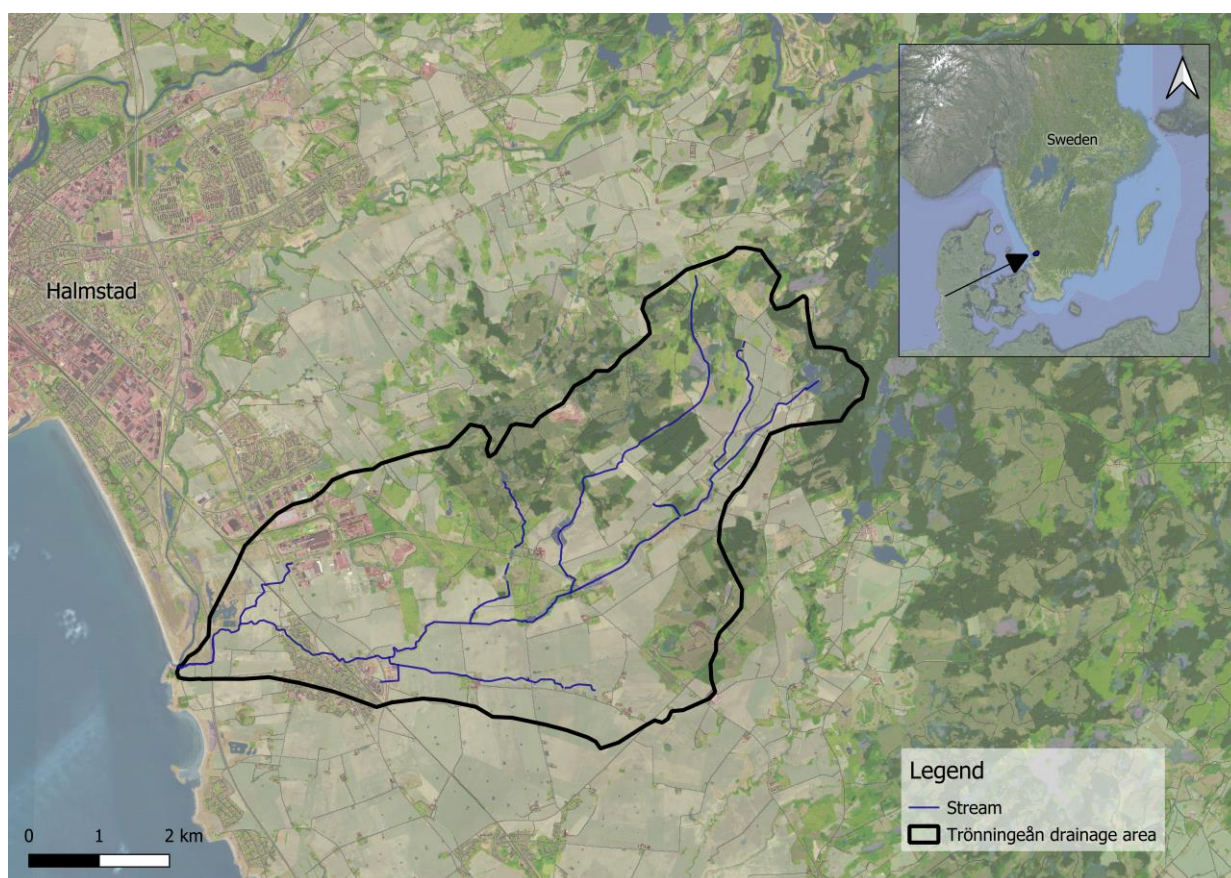
The project succeeded in halving the phosphorus levels to a concentration that now falls within the framework of good ecological status. Today, fish can reach spawning grounds in the upper part of the drainage area, and the presence of fish and other organism groups has increased. Since the measures were implemented, extreme weather events have not led to flooding of houses or farmland.

The project's measures and results will be followed up according to an "After-LIFE" plan which is presented here. The After-LIFE work will continue at least 5 years after project end (2024 – 2028) and will focus on dissemination and monitoring.



Ruddy darter (*Sympetrum sanguineum*)

Project facts



Good Ecological Status in an agricultural stream – Multifunctional measures with nutrient retention and flow buffering as main objectives, along with diversity measures in a holistic perspective.

Acronym: LIFE-Goodstream

Reference: LIFE14 ENV/SE/000047

Project area: Trönningeån stream's drainage area (33 km²) in southern Halland

Land use: 50% agricultural land, 42% forest and 8% urban area

VISS EU_CD: SE628132-132696

Website: <https://goodstream.se/>

Watch the project film by scanning the QR code with your phone.



Coordinating beneficiary: The Rural Economy and Agricultural Society of Halland

Project partners: County Administrative Board of Halland and Halmstad Municipality

Funding: EU LIFE (49%), Swedish Agency for Marine and Water Management (45.6%), Halmstad Municipality (2.1%), C R Prytz Donation Foundation (1.5%) och County Administrative Board of Halland (1.8%)

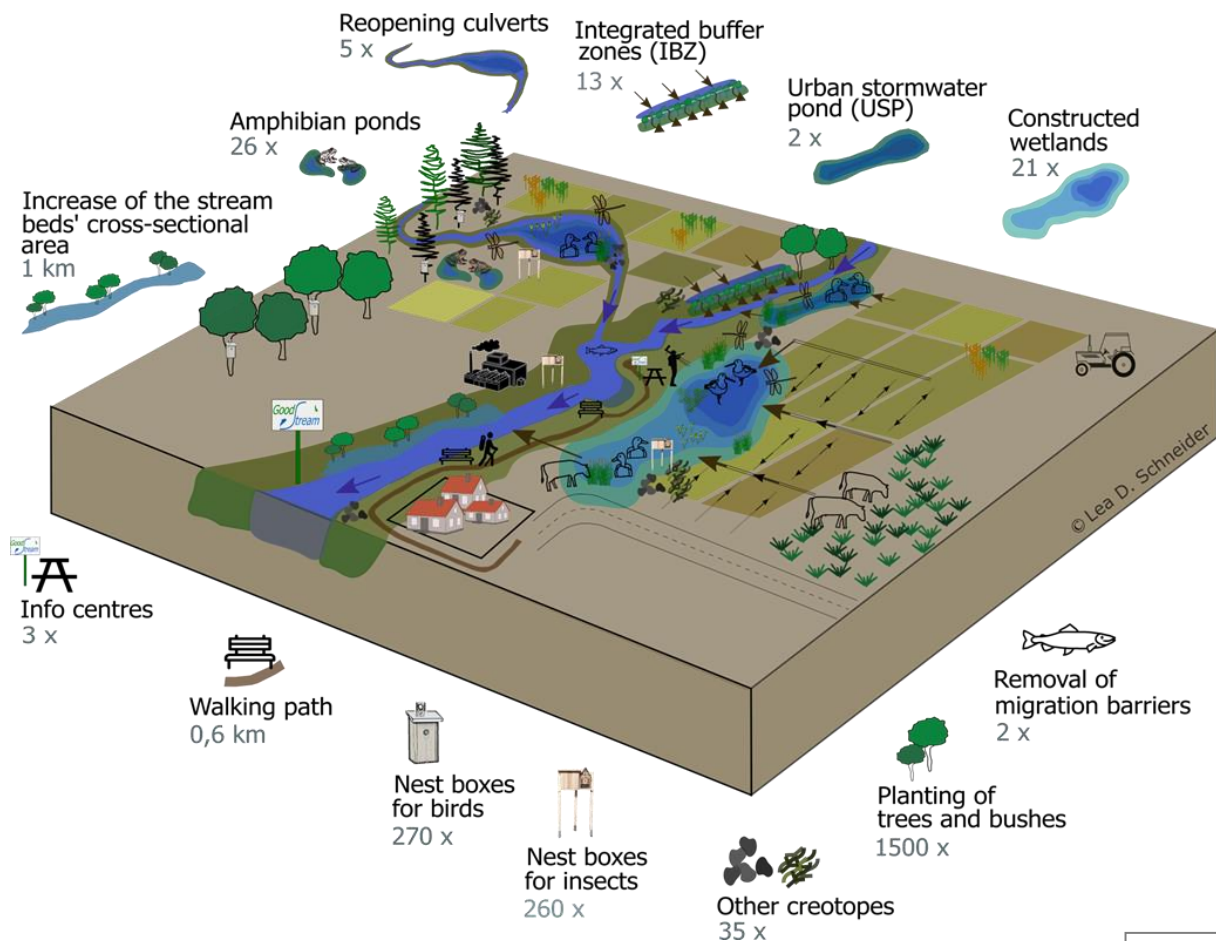
Project budget: 2,002,750€

Project period: sept 2015 – dec 2023

Project measures

To improve the ecological status of Trönningeån, measures have been implemented both on land and in the water throughout the entire drainage area. Landowners played a central role in the project by voluntarily providing land, showing creativity and being open to suggestions. Several landowners have carried out their own measures in addition to the project initiatives.

A significant focus was on addressing eutrophication, such as the creation of wetlands designed for nutrient retention. The wetlands are supplied by nutrient-rich water from which phosphorus can settle in deeper pools and nitrogen is being absorbed through microorganisms and plant uptake in shallow areas. Moreover, integrated buffer zones were established to create long and narrow areas with an infiltration zone directly adjacent to the stream, increasing water purification and carbon sequestration as planted trees grow. Furthermore, culverts were opened to reestablish streambeds. Migration barriers, including an old non-passable wetland and a water threshold, were removed to recreate the historical watercourse. An increase of the stream beds' cross-sectional area was done over a 1 km stretch of the stream to expand the floodplain and reduce local flooding on agricultural land and in the village of Trönninge. To further prevent recurring floods within the village, urban stormwater ponds were constructed to buffer water during heavy rain events.





Measures to increase biodiversity

Multifunctional measures with nutrient retention and flow buffering as main objectives have been designed to also benefit biodiversity. Wetlands and integrated buffer zones were constructed to create high heterogeneity. Reopened culverts were designed as gravel rich streams promoting fish and aquatic insects. Removal of migration barriers enables fish such as brown trout and salmon to move within the system.

Specific biodiversity measures have also been implemented. 270 nest boxes for birds have been set up along the stream. 260 nest boxes for solitary bees and wasps have been installed. Amphibian ponds providing habitat for salamanders, frogs, as well as for dragonflies and aquatic plants have been created. Other creotopes (created biotopes) such as stone cairns, sand pits, fauna deposits, dead wood, etc. have been deployed. Trees and bushes have been planted along Trönningeån and tributaries. Grazing cattle have been released in wetland areas to keep vegetation short and increase biodiversity. We have done > 100 measures to decrease eutrophication, decrease floods and increase biodiversity, and also deployed > 500 nestboxes.



Nudging

The establishment of a walking path in the village of Trönninge, along the stream, has created a behavioural change among residents and a win-win solution for both nature and people. This is achieved through the principle of "nudging." Previously, litter and garden waste from adjacent properties were dumped in an inaccessible area next to the stream, resulting in water pollution. Within the project, the area has been cleaned up and made accessible, and park benches, barbecue facilities, and information signs about nature values have been installed.



Monitoring & communication

During the project, we had extensive monitoring programs for nutrients in the stream and investigated several organism groups, e.g.: mammals, aquatic invertebrates, fish, amphibians, birds, adult dragonflies, and aquatic plants. Communication of project methods and results was also a major part of the work, where we had > 150 presentation (field or indoor meetings). Results were presented at 25 international conferences in the EU. Seven schools have used the measures as outdoor classroom. Monitoring and communication will continue after the project end and is presented on the following pages.

Results in summary

- Decreased phosphorus concentration in the stream from 96 µg/l tot-P to 42 µg/l tot-P.
- Increase in brown trout and salmon by 7% and 26%, respectively, eel with 97%.
- No floods have occurred since implementation of measures despite extreme weather events.



After-LIFE monitoring plan

The After-LIFE monitoring will focus on three of the project's focus parameters:

- Nutrient concentrations in the stream.
- Fish populations in the stream with focus on salmon, brown trout and eel.
- Biodiversity of the constructed wetlands and other measures.

With those three parameters monitored, we will get a very good base to evaluate long-term effects of the measures conducted in LIFE-Goodstream. In addition, we plan to run specific studies on e.g., nutrients, development of the constructed wetlands and integrated buffer zones, and recreational use of our measures (see below).

Nutrients (nitrogen and phosphorus) will be sampled monthly as part of the national monitoring programme conducted by the County administrative board. After 3, 5 and 10 years, we will run a data compilation and analysis to evaluate long-term effects of LIFE-Goodstream. Funding for this monitoring is covered by national funds.



Importantly, after-LIFE monitoring data will be directly comparable with data generated during the project LIFE-Goodstream as the survey site used in the official monitoring programme is the same as one of the sites we have used in the project's nutrient sampling.

Fish will be monitored as part of the national electrofishing programme, conducted by the County administrative board. Already during the project, electrofishing was run within the programme, however after LIFE-Goodstream, the number of sampling sites will be increased to include areas upstream of the two previous migration barriers that were removed in the project. Fish data we will analyse for long-term effects (3, 5 and 10 years after project end) with focus on salmon, brown trout and eel. Funding for this monitoring is covered by national funds.

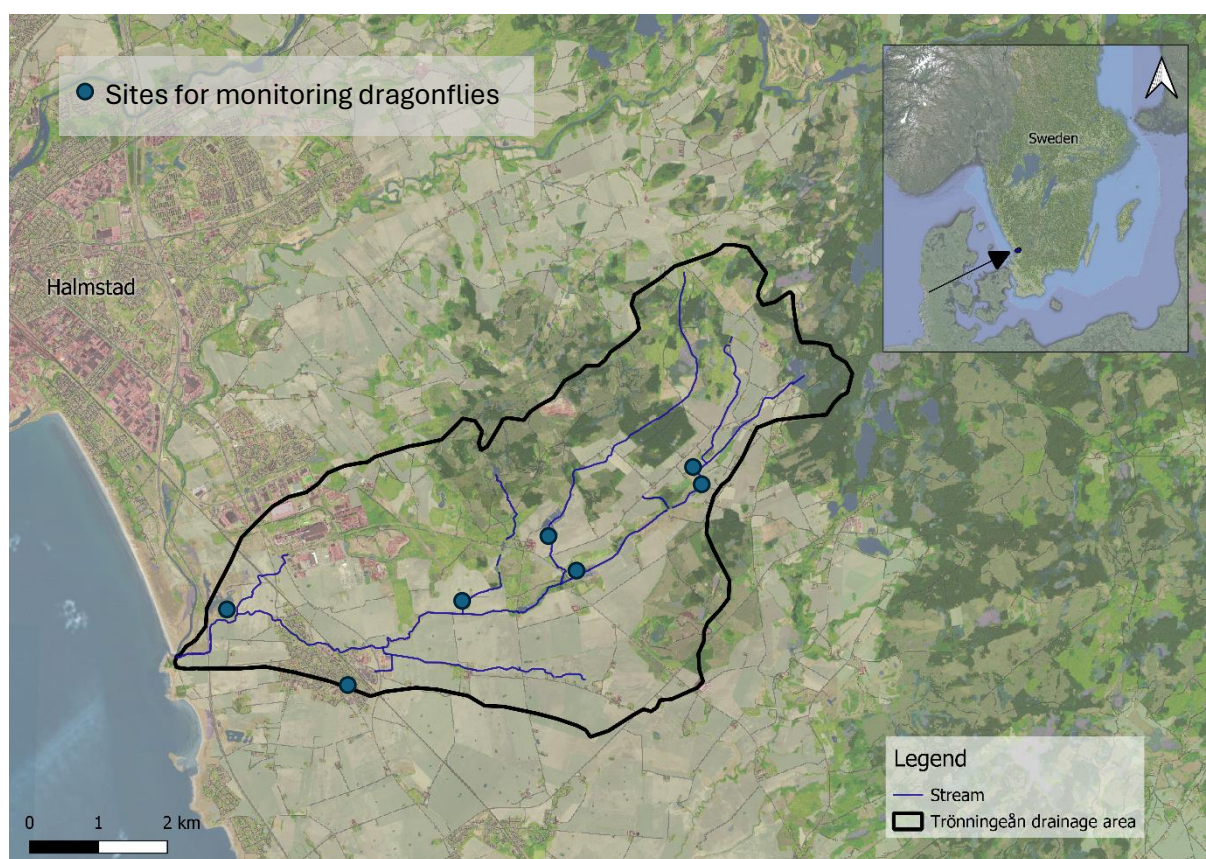




Biodiversity in constructed wetlands and amphibian ponds will be investigated yearly for at least 10 years after the project end. We will focus on our selected indicator organism group, the dragonflies, which are good biodiversity indicators as they have both aquatic and terrestrial life-stages requiring good habitat quality in these environments. In total, seven sites will be monitored every year at three occasions (May/June, July, and August/September). All data will be uploaded to the Swedish Species Information Portal (Artportalen), where already all observations made during the project monitoring are online. Costs for this monitoring will be covered by REAS (coordinating beneficiary).



Monitoring adult dragonflies also enables investigations into how species and species distributions are affected by vegetation development over time, providing good insights in the development of succession stages of the wetlands.



In addition to the yearly and continuous After-LIFE monitoring mentioned above, we will also plan for **specific short-time monitoring studies** on selected parameters:

- Nutrients, more specifically the effects of the urban areas on nutrient levels in the stream and on its status classification. This will entail a sampling programme where water samples are taken before and after the stream passes through the urban areas, and is a good complement to the yearly standard monitoring of nutrients.
- Development of the constructed wetlands and integrated buffer zones regarding vegetation development, sedimentation, and outlet functionality.
- Recreational use of our measures, with focus on the constructed walking path and the nature reserve Trönninge ängar where we have a small project visitor centre.
- Biodiversity of other organism groups apart from dragonflies in LIFE-Goodstream measures. Particularly amphibians and otter are of interest.

These specific studies will be conducted by students from Halmstad University as offered topics for their final thesis-works. We have very good cooperation with Halmstad university and teach at several courses (and use LIFE-Goodstream as example in the teaching), and regularly have thesis-students working in our projects. During LIFE-Goodstream we have had ca 20 thesis-works conducted in the project, and this will continue also after the project end. It is a win-win situation where the students get external supervision from us and we can also supply them with background data, whereas we get much extra data for the project.



In addition to theis-works, we also offer internships to students from Halmstad university, and we normally have 1-2 interns working with us every year. Apart from students from Halmstad university, we had, in LIFE-Goodstream, interns from Germany, the Netherlands and Hungary. This will also be a resource for monitoring studies the years after the project end.



After-LIFE communication plan

Communication of LIFE-Goodstream methodology and results will continue long after the project end. This will be ensured and facilitated by several factors such as:

- Resources in the form of > 70 dissemination units (Layman's reports, fact sheets, handbooks, articles, project reports, videos, posters, and roll-ups). This material is available both in Swedish and English.
- Digital resources; website (in English) and Facebook page (in Swedish).
- Three different visitor centres in the field and several information signs at various sites in the drainage area.



- Very good meeting facilities at coordinating beneficiaries' offices where we have ca 500-2000 persons visiting yearly from stakeholder groups such as landowners, authorities, and politicians, and where LIFE-Goodstream material is displayed.
- A huge amount of data collected during the project which will result in ca 10 scientific papers the following 5 years (thus reaching the research community).
- The coordinating beneficiary's engagement in two large national programmes; "Focus on nutrients" where landowners can get advice on wetland construction, management, and restoration, and "LEVA-Halland" where catchment officers help landowners combat eutrophication.



Our after-LIFE communication efforts will be communicated to the following stakeholder groups for the first 5 years after the project (2024-2028) through the following activities:

Researchers/scientific community:

- 10 scientific papers
- 3 international conferences
- One new research project in the LIFE-Goodstream project area

Landowners:

- Advise activities through “Greppa näringen” (Focus on nutrients)
- Advice activities through “LEVA-Halland”, catchment officers.

County boards/municipalities:

- Attending workshops, conferences.

All:

- Continued update of website.
- Continued use of dissemination material.



The EU-LIFE financial instrument is to us very obviously a necessary tool in order to implement and maintain innovative ideas in nature conservation and environmental work in the EU. National funding is rarely sufficient or not possible to utilize for these kinds of long-term projects with resources both for the actual measures but also for the important monitoring and communication aspects. During LIFE-Goodstream, we have through our close cooperation with the landowners received very valuable information, problem identification and ideas from them. The input from landowners together with our own observations during the work with measures and monitoring have given us incitement to new LIFE-projects. The data and knowledge we have collected in LIFE-Goodstream will be the base for a new application with focus on areas where we (and the landowners) have identified environmental and nature conservation problems. We plan for LIFE-Goodstream to be the spark, or starting point, for continued work with the overall aim of managing the agricultural landscape that can maintain an efficient food production and simultaneously support high biodiversity and a healthy environment, even under the current and coming climate changes.

