

# Västervik: WATERDRIVE Case Area in Sweden

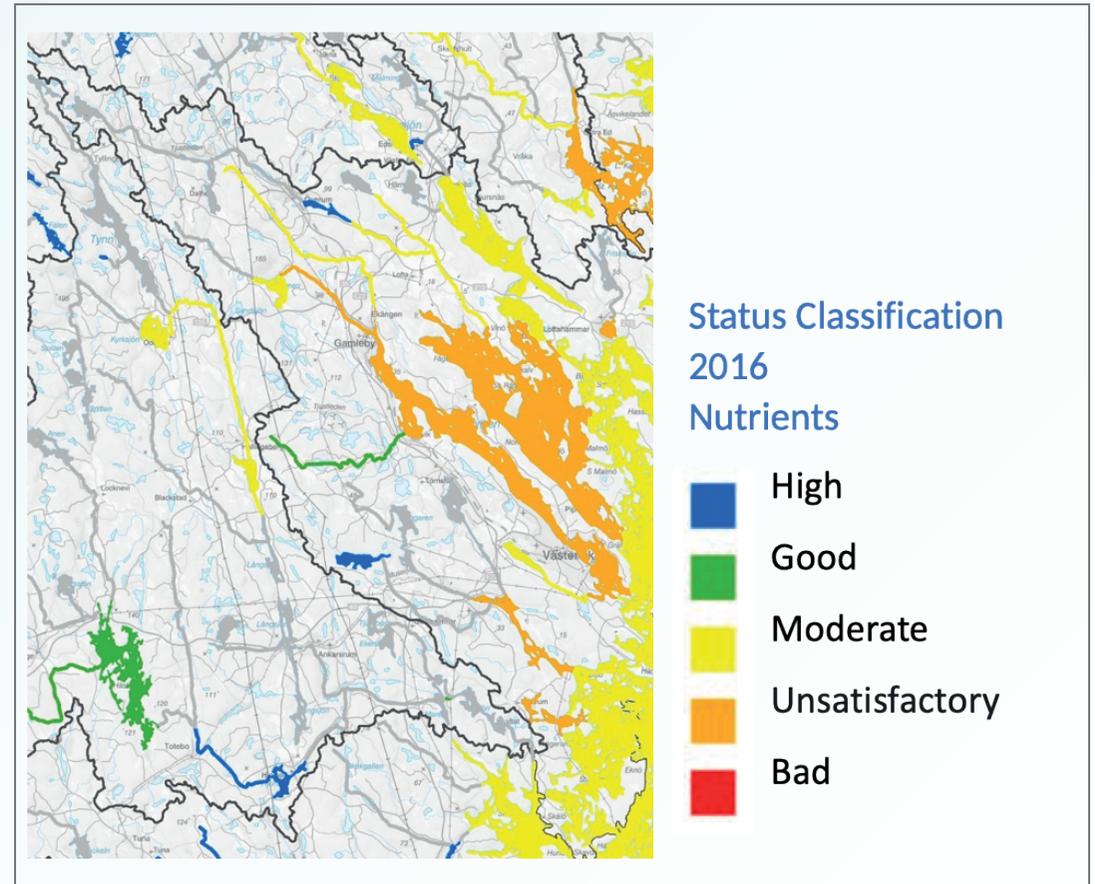
**Gun Lindberg and Anders Fröberg**  
Västervik Municipality

# Responsibility for Baltic eutrophication

Västervik Municipality has a long coast and an extensive archipelago (about 5000 islands). Most of the bays are deep with a shallow mouth. The exchange of water between the inner deeper part and the open sea is low. This makes benthic ecosystems particularly vulnerable. The poor water circulation leads to nutrientrich water and bad oxygen conditions at the bottom.

As Västervik is characterized by its proximity to the Baltic Sea, the eutrophication problem is palpable.

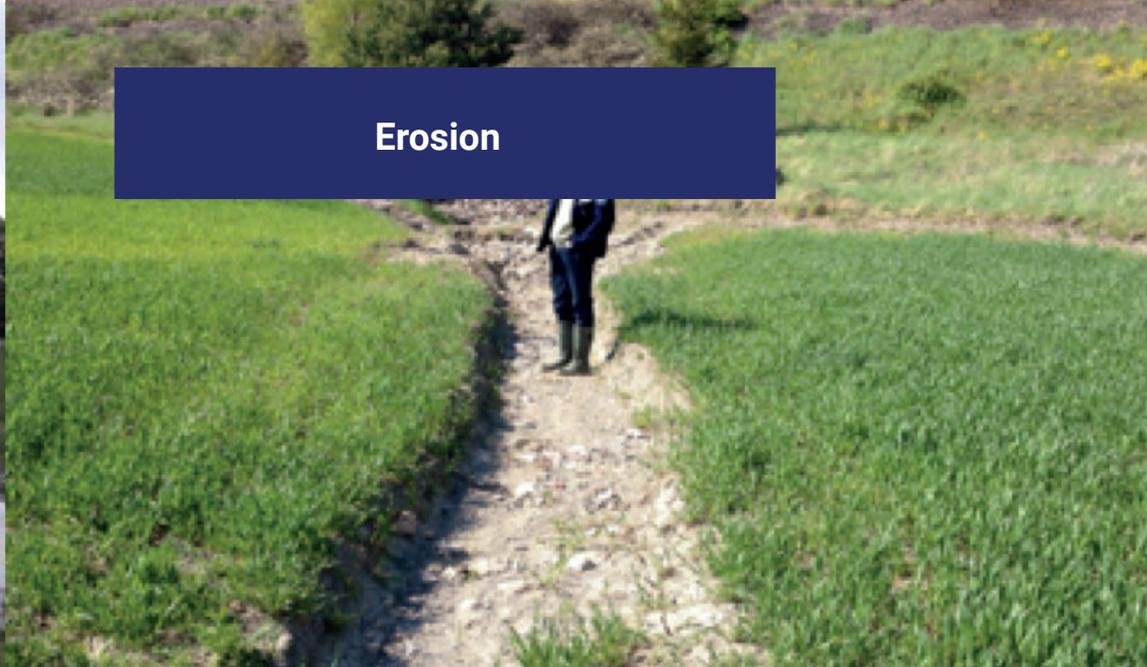
The symptoms of eutrophication have been obvious; including increased distribution of algae's, decreased water transparency and reduced opportunities for recreation.



Challenges!



Erosion



Flooding



Draught

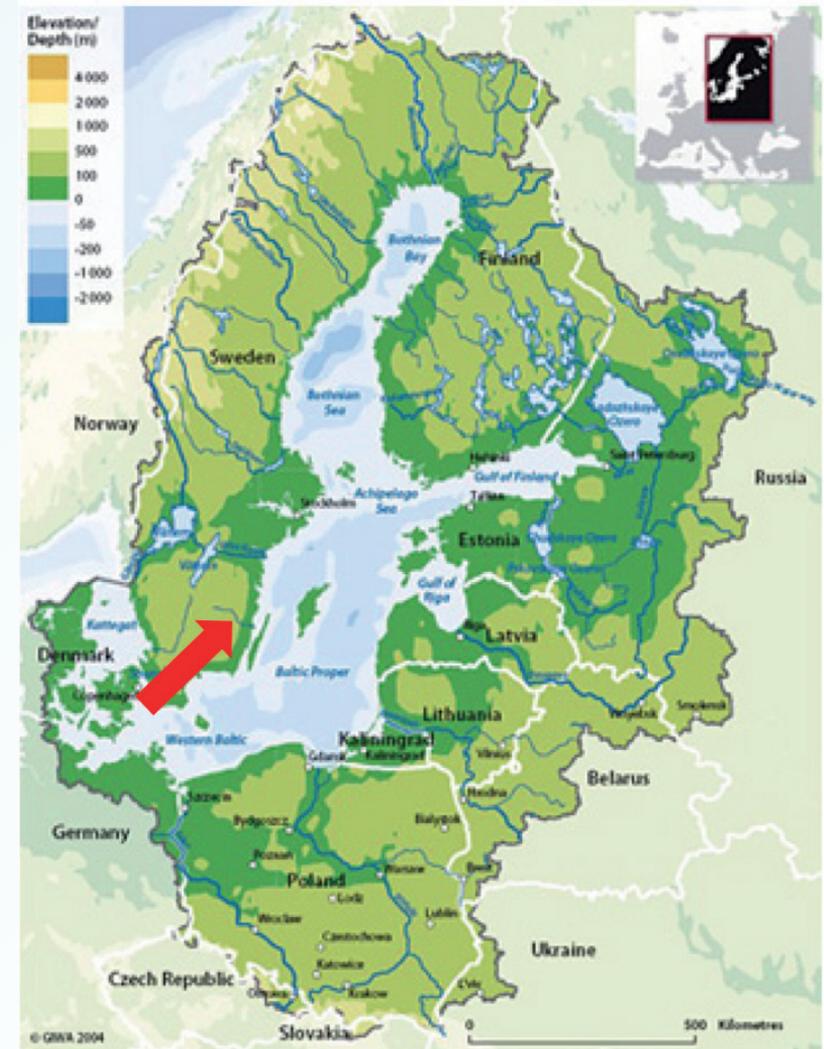


# Västervik in The Baltic Sea Region

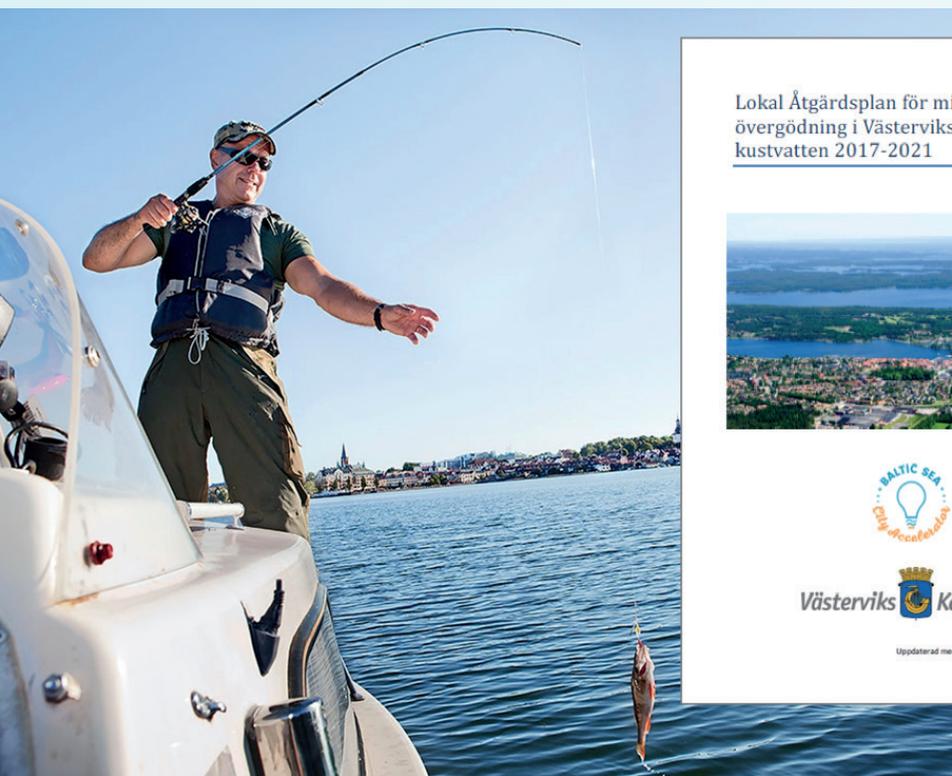
Västervik Municipality is located in southern Sweden, in the north of Kalmar County with the Tjust archipelago and the Baltic Sea in the east

Västervik covers one of the largest municipality areas in southern Sweden. The land area covers 1 875 km<sup>2</sup> and there is almost as much water area as land area.

Agriculture and forestry are important sectors in Västervik. The tourism industry is also important for Västervik, as the municipality receives about 1.5 million visitors annually.



# Västervik



Lokal Åtgärdsplan för minskad övergödning i Västerviks kommuns kustvatten 2017-2021



Västerviks Kommun

Antaget av KS 2017-05-22  
Uppdaterad med ny Vision 2030 antagen av KF 2017-06-19

In 2017 a **Local Action plan for reduced nutrient leakage** was approved by the Municipal Council and 2018 a Local Plan for Target area Loftaån was established.

Measures needs in agriculture, wastewater, stormwater and other areas.

The plan is based on both modelling and monitoring. Nutrient load nitrogen and phosphorus are described and the nutrient sources. Priority of areas and need for actions is described.

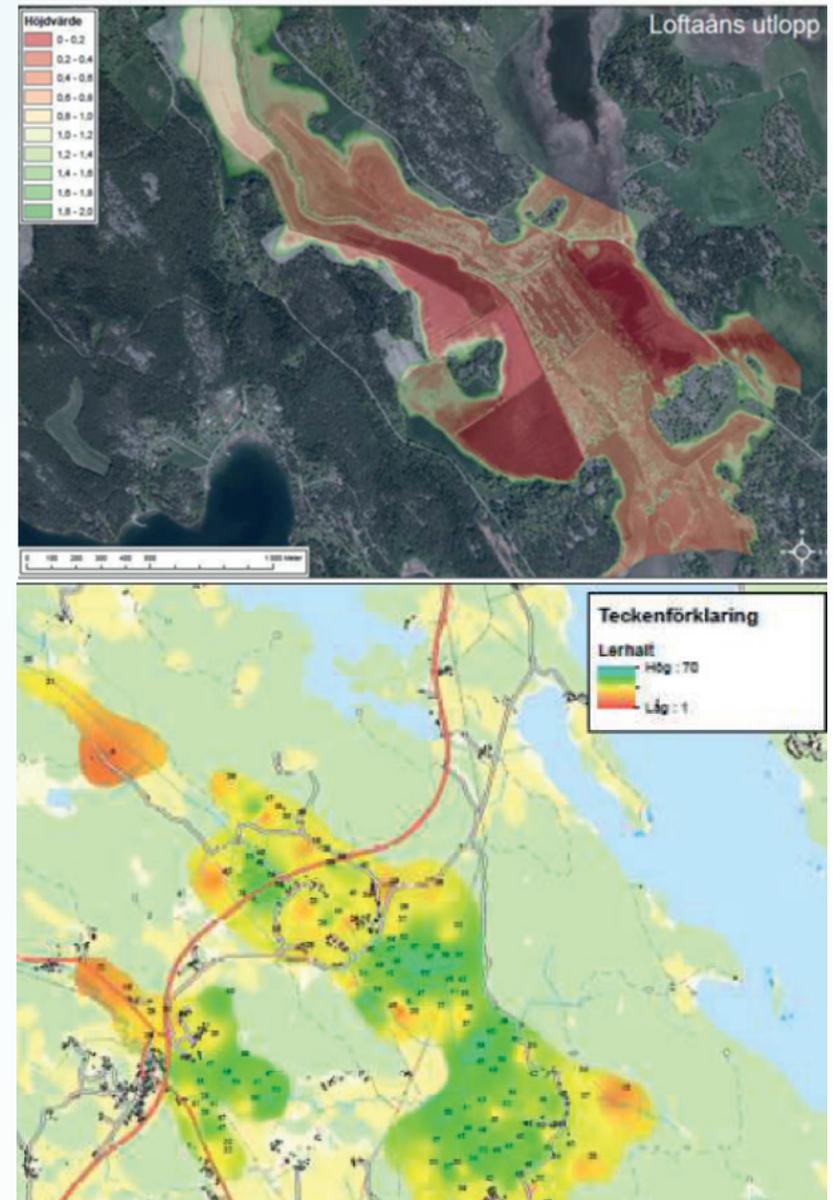
# Doing the right action on the right place

It is important to apply targeted measures to the identified problem in the right location at the catchment scale.

**SWOT-analyses are made together with landowner and includes the following advices:**

1. Optimize the plant environment by efficient nutrients use (advice, adapted crops, increased root growth, adapted fertilization and improved soil structure)
2. Keep the nutrients in the soil profile (reduces erosion, reduce soil compaction, improve soil structure, increase soil fertility)
3. Stop the load of nutrients before it reaches the sea (sedimentation ponds, wetlands)

Information on field are completed with GIS-analyses, soil mapping and different kind of information from maps as historical maps, status of the body of water.



**Filter ditches (lime and biochar) & Structure liming**

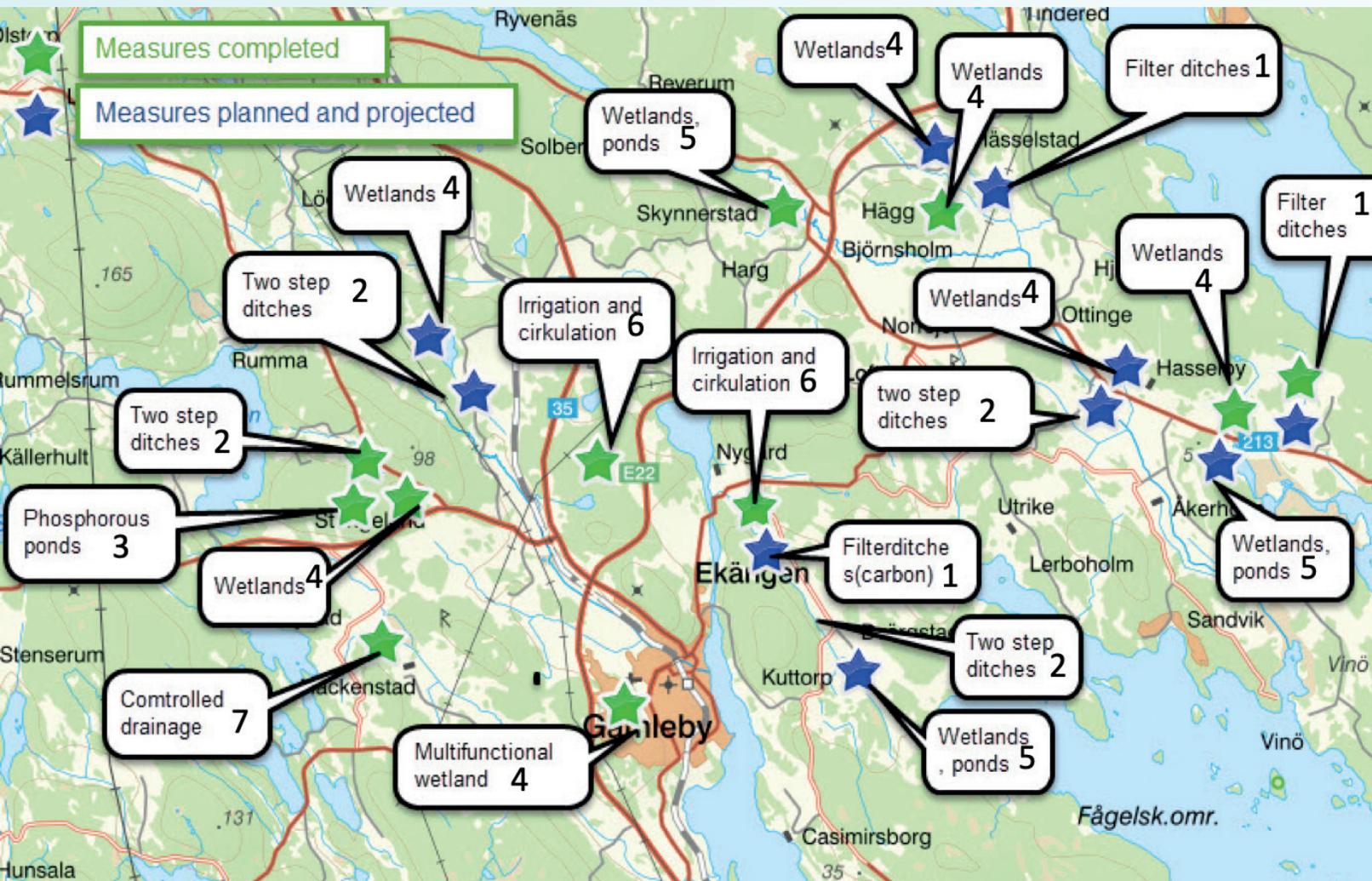


Filter ditches (lime and biochar) & Structure liming



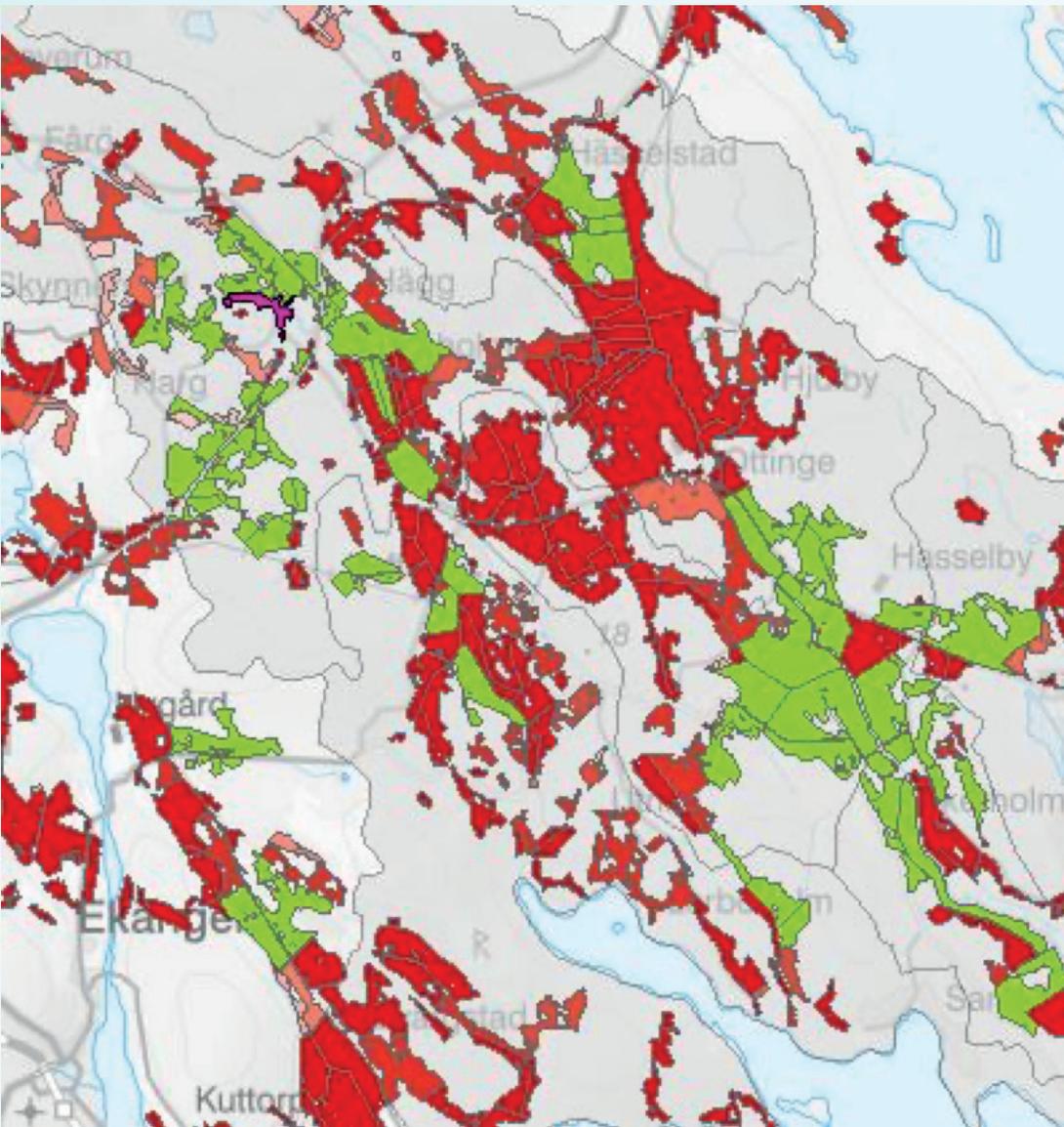
Two step ditches

## Measures completed (green) or planned and projected (blue):



1. Filter ditches (lime, woodships, biochar)
2. Two stage ditches
3. Phosphorus ponds
4. Wetlands
5. Wetlands, ponds
6. Irrigation (restoring eutrophied bay)
7. Controlled drainage

## Structure liming



**Green** - measures completed

**Red** - possible fields - planned



Structure liming, Filter ditches, and Phosphorus pond

## Calculation of costs of environmental measures – reality

Measures	Cost
Soil mapping	20 Euro/ha
Structure liming	800 Euro/ha
Wetlands	20 000 Euro/ha
Phosphorus pond	30 000 Euro/ha
Ecological functional zones	45 Euro/m
Lime/biochar filtration ditches	5 000 Euro/ha
Woodchips filtration ditches	3 000 Euro/ha
Two step ditches	50 Euro/m
Bevelling ditches	25 Euro/m
Protection zones	500 Euro/ha
Adapted groundwater surface	1 500 Euro/ha

## Cost of measures implemented in 2018-2020

Measures	Area	P-decreases kg/year	Costs in Euro
Structure liming	500 ha	100	400 000
Wetlands	12 ha	120	240 000
Phosphorus pond	1 ha (8 ponds)	70	30 000
Two step ditches	2 km	500	100 000
Bevelling ditches	1.5 km	25	37 500
Filter ditches (lime)	30 ha	30	150 000
Soil mapping	500 ha	75	15 000
Protection zones			500/ha
Adapted groundwater surface	10 ha		150 000
Irrigation (restoring eutrophied bay)	300 ha	500	500 000

# Catchment officer: the link between farmers and other Actors

The idea with the service is helping the farmers/landowners making steps for a sustainable development - Doing the right measure on the right spot and to reduce the nutrient load by implementing measures.

The catchment officer is the link between the landowners, the municipality, the County and different funding agencies, as well as a link to consultancies that construct the actual measure or restore the landscape function(s).

The catchment officers are a contact to authorities and academia and will also help with the administrative burden that often follows landowners when, and if, they want to implement measures on their land.



# How the catchment officer can work, step by step, in a smaller catchment area, in collaboration with the farmer/landowner:

- **Building partnerships.** Initial dialog with farmers in the Catchment area. Meetings in small groups and one by one in the field. Information about measures and how to implement them in their area and on their farms. Appointments of meetings in field (interested farmers/landowners). An important role for the catchment officer is sharing information and knowledge.
- **Local action plan.** SWOT-analyses are made at the farms in collaboration with the landowners. Problem areas on the fields turns into interesting spots for measures. Investment plans and priorities are made.
- **Financing.** Calculation of costs for the investments and actions. Funding possibilities from national and regional funds. Applications for grants to regional and national authorities are normally made by the municipality.
- **Agreement** – When the farmer/landowner are ready to implement a measure, a written agreement will be signed. It contains what to do, when, by whom, costs, and future maintenance.



# How the catchment officer can work, step by step, in a smaller catchment area, in collaboration with the farmer/landowner:

- **Procurement.** It is not always the farmer/landowner are implementing the measures themselves. The catchment officer helps with procurement if it is necessary.
- **Implementation.** When the farmer/landowner are digging/working the catchment officer can support by phone and on site. Adjustments will be realized in consensus.
- **Final inspection.** When the work is completed, an approval inspection is performed by the catchment officer.
- **Monitoring.** The catchment officer will follow-up the measure in collaboration with the farmer/landowner.
- **Reporting.** Contacts with concerned authorities is done by the catchment officer. The catchment officer reports the implemented measures to the funding authorities. Arc-GIS is used for map construction.



## Suggestions for the future for an organization with catchment officer service on a local level

- Act locally to create knowledge and commitments between stakeholders in the area.
- Find and prioritize the most interested farmers to start
- Make SWOT analysis on field/watercourses level with landowners – Turn problem areas on field to interesting spots for implementing measures.
- Develop a Local Action Plan for the watercourse and the farm in dialogue.
- Simplify as much as possible with clear objectives.
- Set common objectives that generate "win-win" concept both reduced eutrophication, climate adaption, biodiversity and increased harvest.
- Holistic view - close to farmers/landowners and stakeholders

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