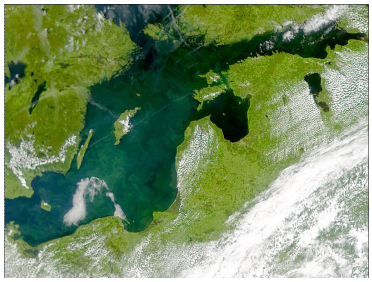
EUTROPHICATION

Two different stages of the Baltic Sea.



The algae growth of the Baltic Sea is observable from space.

Manure is an important agricultural resource as a fertilizer, but the improper storage and spreading of manure can cause pollution of waterbodies. The same threat comes from excessive or wrong use of mineral fertilizers.

AGRICULTURAL POLLUTION IS DAMAGING THE MARINE ENVIRONMENT

Our home sea – the Baltic Sea – is highly polluted because of insufficient water circulation, a dense population and a very large catchment basin. Every litre of effluents or kilogram of fertilizers from fields will finally reach some body of water and takes its effect on the living organisms there.

Eutrophication is a process which is caused when too many nutrients enter a body of water causing large growth of some species of algae, degradation of sea life and overgrowth of water bodies. Eutrophic bodies of water have massive bloomings of blue-green algae, which decreases the transparency and natural beauty of water. In addition blue-green algae use up all the oxygen and poisons the water causing massive death of fish and skin damage to bathers. Such water is not suitable to be used as drinking water for animals. **The only way to limit eutrophication of water bodies is to decrease the pollution levels.**

WHY IS EUTROPHICATION HARMFUL?

Eutrophication causes lack of oxygen in the water, which in turn causes numerous problems, such as the replacement of long-lived plants with fast growing short-lived plants, death of fish species due to overgrowth of spawning areas, degradation of sea bottom flora and fauna, and the breaking of the food chain that it causes. Another effect of eutrophication is that because of the lack of oxygen so called "dead zones" appear, where all life disappears. Also the overgrowth of coastal areas with reed is often caused by water pollution.

HOW DOES NITROGEN AND PHOSPHORUS END UP IN WATER BODIES?

Nutrients from the agricultural sector often leach into bodies of water because of improper use of manure. For example from leaking silage and manure storage, by spreading manure on frozen ground, by using mineral fertilizers without considering the balance of nutrients or spreading fertilizers at the wrong time. Nitrogen and phosphorus leach from the soil during ploughing, during snowmelt, wind, rain and snow put the particles of soil into motion.

If water bodies are polluted for a longer period of time, nutrients, especially phosphorus, is accumulated in large quantities in sediments. Phosphorus can be reintroduced into the water from these sediments if there is a mechanical stir-up or a storm. The same can happen due to lack of oxygen, which triggers a chemical reaction and phosphorus is made available for algae once again.

HOW DO WE DECREASE THE AMOUNT OF NUTRIENTS REACHING WATER BODIES?

In agriculture special attention should be paid to fertilizing, the handling of manure and the keeping of animals in the winter – it is necessary to create liquid-proof manure and silage storages, feeding grounds and barns, ensure adequate litter for livestock and that if deep straw bedding is used this is managed correctly. Also exact and well timed spreading of manure is important to ensure that the nutrients are quickly absorbed into the soil. Manure heaps should be covered properly to avoid leaching of nutrients into ground and surface water via rain. Nitrogen can leach from uncovered

This publication, which is produced within the framework of the EU project Snowbal (Saving the Sea from Nutrient Overload by managing Wetlands/grasslands BaLtically), reflects the author's views. The Managing Authority can not be held liable for the information published.

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Enajärvi wetland in Finland was built between intensively used fields in a depression on a grassland that was repeatedly flooded. To reduce the leaching of nutrients into the nearby lake, a deeper terraced sedimentation basin was dug in front of the natural wetland. The basin slows down the water flow, increases the settlement of particles and the uptake of nutrients by plants thereby decreasing the nutrient flow into the lake. The wetland also enriches the landscape and helps to increase biodiversity.

heaps and during the transport through air pollution, which can travel hundreds of kilometres.

In summer natural pastures can be used for grazing. Compared to cattle who are kept indoors and fed with grains, the grazing animals contribute less to nutrient run-off by eating unfertilized grass. The manure from grazing cattle will also be taken up by plants naturally and not contribute to pollution.

HOW CAN POLLUTION BE REDUCED?

Pollution of water bodies can be reduced, for example through buffer zones near ditches and other water bodies. The plants and trees use nutrients for growth, preventing the nutrients from reaching the water. Buffer zones are also habitats for many species, for example willows growing on ditch banks are an important source of food for bees and other pollinating insects in early spring. Very good measures for reducing water pollution is natural or purpose-built wetlands, buffering flood plains, sedimentation ponds and constructed wetlands. When talking about ditches, it is important to remember that straight and deep ditches have a strong water flow, nutrients do not settle down and instead reach bigger water bodies (lake, sea), therefore wide and straight ditches should be avoided and water flow minimized. This can be achieved for example by creating meandering stretches or sedimentation ponds. Sedimentation of nutrients can also be increased by placing big stones on the bottom of the ditch.

To minimize erosion on fields with grass lays seed can be sowed into the ground without ploughing. Leaching of fertilizers can also be avoided by planting winter vegetation on fields, which prevents the leaching of nutrients with spring time snowmelt. Landscapes that are continuously covered with grass have practically no erosion, thus pollution of the Baltic Sea can also be reduced through use of semi-natural grasslands for grazing or production of hay for example.

FACTS

Eutrophication is mainly caused by phosphorus and nitrogen from agricultural, industrial, and private housing effluents. Eutrophication became an major environmental problem around 50 years ago, when agriculture was intensified, mineral fertilizers became widely spread and large areas of wetland were ditched dry. Liquid-proof manure and silage storages, proper fertilizer spreading techniques, functioning natural and artificial wetlands, buffer zones with vegetation, meandering ditches and landscape features that slow down water flow all prevent nutrients from reaching the Baltic Sea.

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