

## WHY ARE PREDATORY FISH STOCKS SO IMPORTANT FOR THE BALTIC SEA?



Photo: Vattenekolögerna

An ecosystem contains of a food web of interacting plants and animals, which are dependent of, and influence, each other. If the preconditions of an ecosystem change, the entire food web is often affected. A typical example is eutrophication which occur when the supply of nutrients in the sea increase, leading to an uneven balance between plants and grazers.



Photo: Vattenekolögerna

A grazer among filamentous algae.

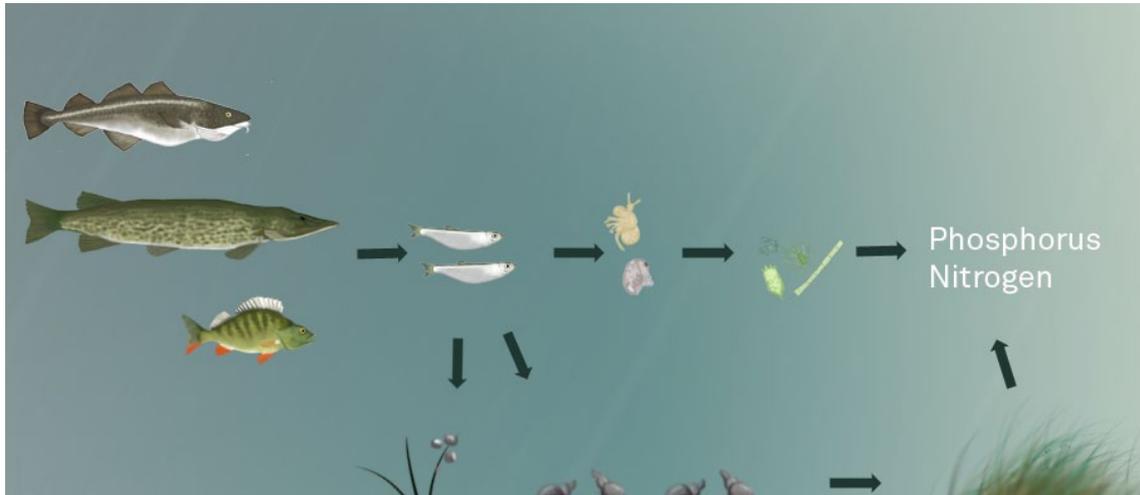
Phytoplankton and filamentous algae feed on nutrients - nitrogen and phosphorus. When human activity generates a substantial increase in nutrient supply, phytoplankton and filamentous algae can grow and form algae blooms. Zooplankton - that feeds on phytoplankton, and other grazers - feeding on filamentous algae, does not increase in the same pace, resulting in an imbalance. It is of great importance that there are strong populations of zooplankton and other grazers in a eutrophied sea like the Baltic Sea.

Everything is interconnected in an ecosystem. Zooplankton and other grazers are prey for smaller fish species, like roach and stickleback, which in turn are prey for larger fish species such as pike, cod and perch. A large predatory fish stock, which keeps stocks of smaller fish down, is important to maintain a strong population of zooplankton and other grazers, which can counteract the eutrophication by their grazing on the growing vegetation.



Photo: SMHI

Algae blooms are the result of a very high and fast increase of phytoplankton. Algae blooms are not only negative - without the regular natural algae blooms the food web in the sea would collapse.



Cod, pike and perch are important in the Baltic Sea food web in order to control the populations of smaller fish. Smaller fish eat, in addition to zooplankton, the eggs of predatory fish and other grazers (such as shells and crustaceans). Zooplankton and other grazers can control the amount of phytoplankton and filamentous algae - an important function in a eutrophied sea. Through a strong stock of predatory fish the populations of smaller fish can be reduced in favor of zooplankton and other grazers, which reduce the imbalance in the Baltic Sea food web.

Eutrophication favors phytoplankton and filamentous algae at the expense of perennial algae and vascular plants such as bladder wrack, eelgrass and characean algae. Large quantities of phytoplankton make the water murky which prevents the sunlight to reach deeper depths, leaving deeper sea beds uncolonized by vegetation. The benthic vegetation is important in many ways, for instance as a fish nursery.



Pike fry.

A substantial increase in growth of phytoplankton and filamentous algae also increase the extension of anoxic bottoms of the Baltic Sea. When the algae die they sink to the sea bed and decompose - a process that consumes and eliminates oxygen from the bottom water. The Baltic Sea already has a widespread problem with hypoxia. Oxygen deficiency leads to increased leakage of phosphorus from the sediment

which generates even more nutrients for the algae, resulting in more eutrophication and more oxygen deficiency - a vicious circle. A better balance between phytoplankton and zooplankton and between filamentous algae and other grazers is therefore important for all organisms in the sea, and here the predatory fish has an extremely important role to play!

Within the project "[Living coast](#)" you can read more about measures performed to reduce eutrophication, such as the building of wetlands for pike reproduction and re-introduction of bladder wrack! Read more about the project "[Wetland restoration for viable predatory fish stocks](#)" and the subsequent project "[Restoration efforts with perch in focus](#)".

## Short facts about predatory fish in the Baltic Sea

### Pike

Pike is found throughout the Baltic Sea, especially along the coast. Eutrophication, however, contributes to overgrowth of filamentous algae in many of the pike's spawning areas, which is one reason for the decrease of the pike stocks. Ten to fifteen days after spawning the pike eggs hatch. The newborn fry attach to vegetation in the wetland or in the reed belt, where they stay for about two weeks before they swim away. The pike grow very fast, in their first year they can grow up to 20 cm.



Photo: Vattenekolögerna

### Perch

Perch is also found throughout the Baltic Sea. In spring and summer they stay near the shore and in the autumn and winter they swim into deeper areas along the coast. When they are young and small the perch live in shoals, but with increased size and age they swim away and live a solitary life. Perch lay their eggs in a sticky coat, like a milky-looking ribbon, in the vegetation in shallow waters.



Photo: Folke Rydén Production

### Cod

Cod live, unlike perch and pike, in the deeper off shore areas of the Baltic Sea. Fertilized cod eggs sink to a water layer with a salinity of at least 10 per mille (PSU), where they float for about 2 weeks before they hatch. The eggs require a certain oxygen content to grow and develop. If the oxygen levels are too low at the water depth with the right salinity, the eggs will remain unhatched. Unfortunately, this is common in the eutrophied Baltic Sea with its vast areas of hypoxic bottom water.

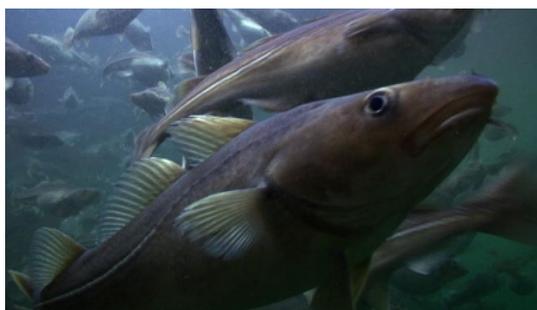


Photo: Peter Östlund