

Reducing nutrient load from catchments

2.5. Impacts of nutrient load

2.5.1. Eutrophication

- Excess nutrient availability causes eutrophication
- Eutrophication is expressed by:
 - Increased growth of phytoplankton
 - Increased turbidity
 - Increasing of water plants
 - Excessive algal growth
 - Oxygen demand (BOD and COD) increases

Find out what BOD and COD mean: (the links lead to environmental dictionary)

[BOD = biochemical oxygen demand](#)

[COD = chemical oxygen demand](#)

In the **early phase** of eutrophication:

- species diversity
- algal production
- quantity of zooplankton
- planktivorous fish

increase

In small, shallow lakes and lakes with long retention time, the disadvantages of eutrophication emerge sooner



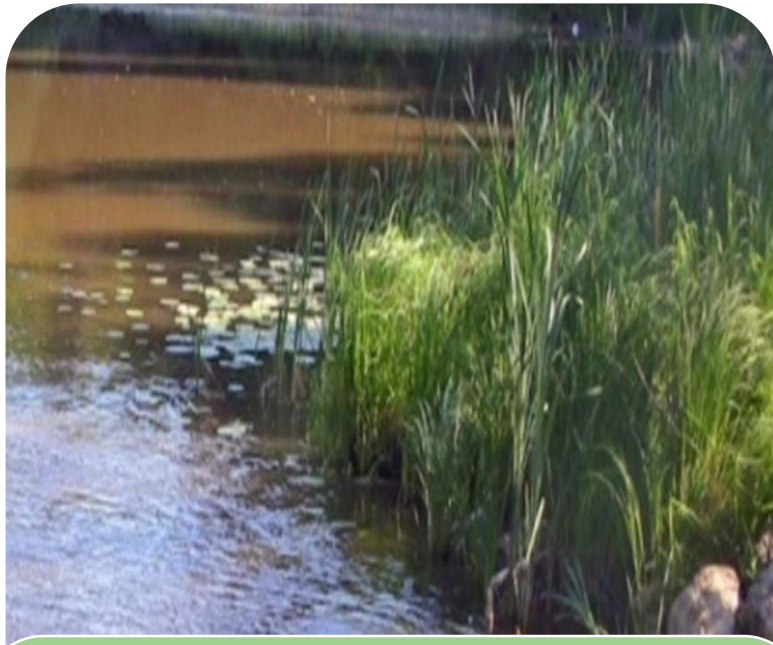
Photo: TUAS Water Engineering

By on going eutrophication:

- The water becomes turbid
- The shoreline gets shallower
- Algal blooms (massive occurrence of algae or cyanobacteria)
- Macro vegetation increases
- The bottom (bed) gets softer
- Oxygen depletion occurs and changes in fish communities happen (species composition)

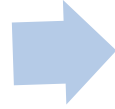


Bluegreen algae blooming in lake Kuralanjärvi
Rymättylä, Finland (photo: TUAS Water Engineering)



In the early phase of eutrophication increasing of:

- species diversity
- algal production
- quantity of zooplankton
- planktivorous fish



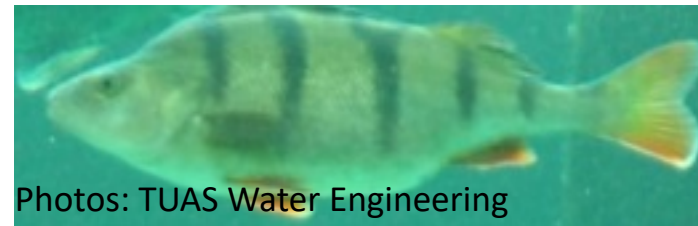
By ongoing eutrophication:

- water becomes turbid
- the shoreline gets shallower
- algal blooms (massive occurrence of algae)
- macro vegetation increases
- the bottom (bed) gets softer
- oxygen depletion occurs and changes in fish communities happen (species composition) and species diversity decreases

The changes in the fish community:

- Usually by ongoing eutrophication the following species become less abundant:

- Salmonid fish
- Burbot
- Pike
- Perch



Photos: TUAS Water Engineering

...While these species become common and abundant:

- Roach
- Bream
- Silver bream
- Other cyprinid fishes

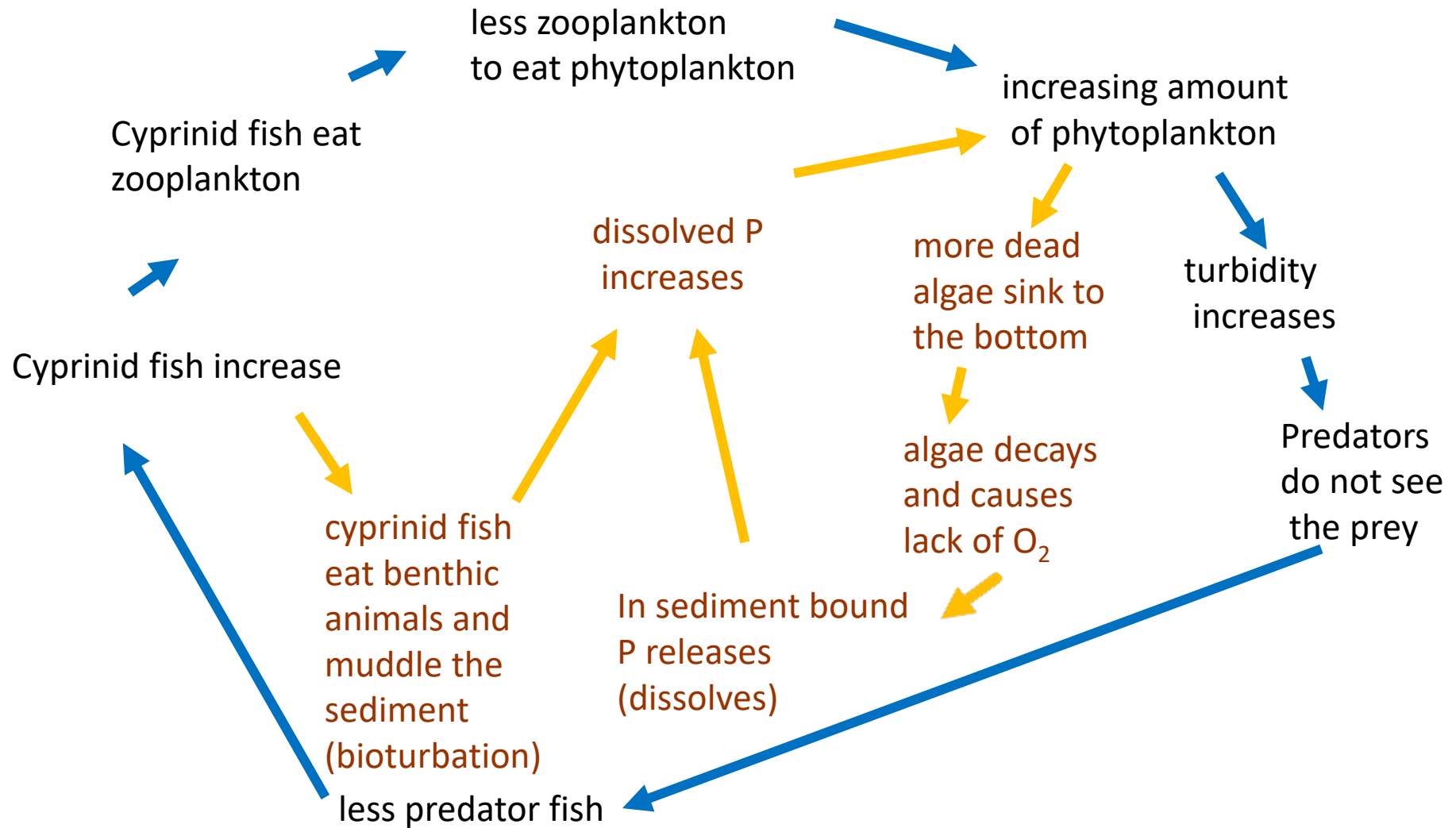


- In addition to the changes in fish communities, the growth of the fish eventually decreases
- In very eutrophicated waters, the cyprinid fishes can contribute to algal blooms e.g. by almost feeding out zooplankton (which thus can feed less phytoplankton)
- The cyprinid fishes also cause bio-turbulence by searching benthic animals in the sediment

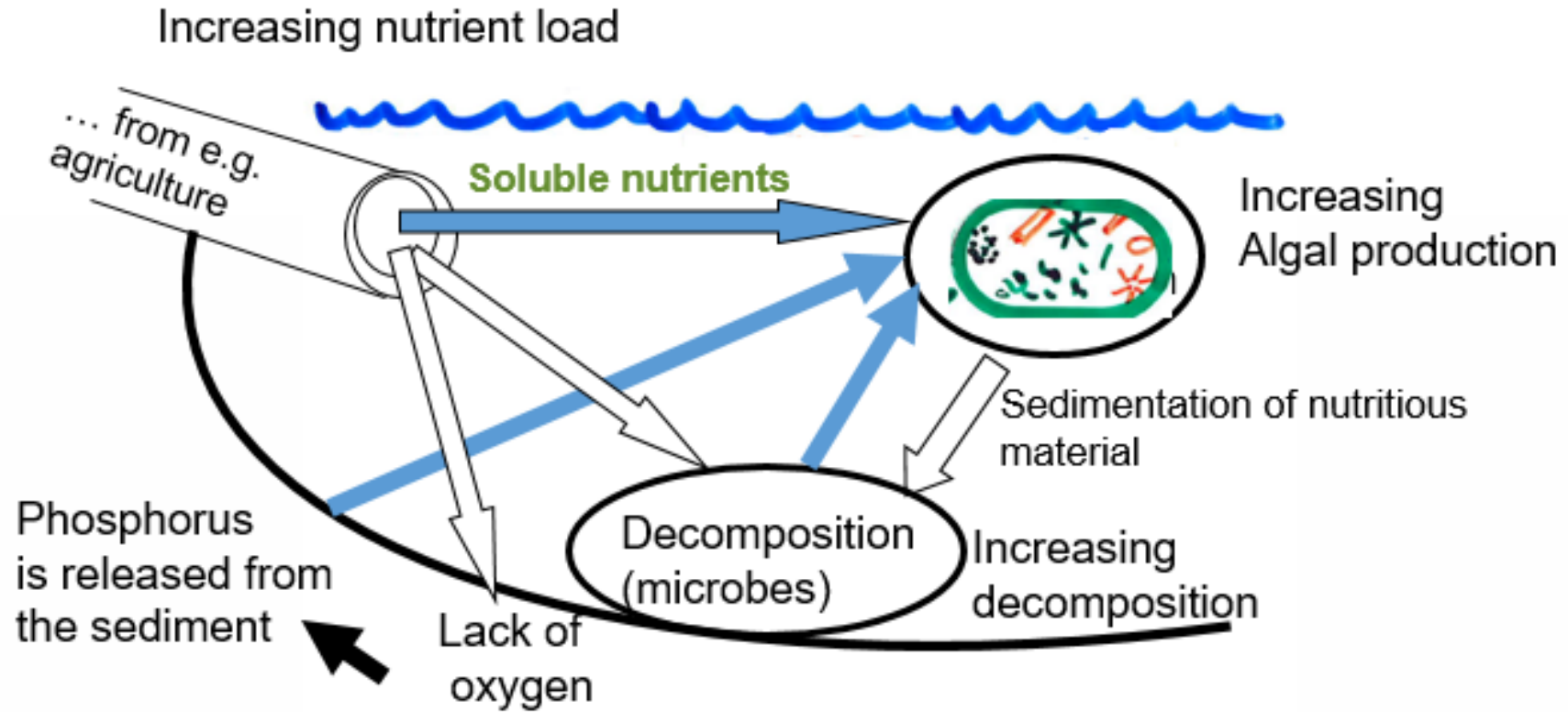


Photo: TUAS Water Engineering

The role of planktivorous fish in an eutrophic lake



Eutrophication



[Learn more:](#)



References and further reading

- European Comission 2016. Eutrophication.
http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-5/index_en.htm

Acknowledgements



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