

Project 14: Long-term development in the ecological status of Lake Päijänne: pressures and responses

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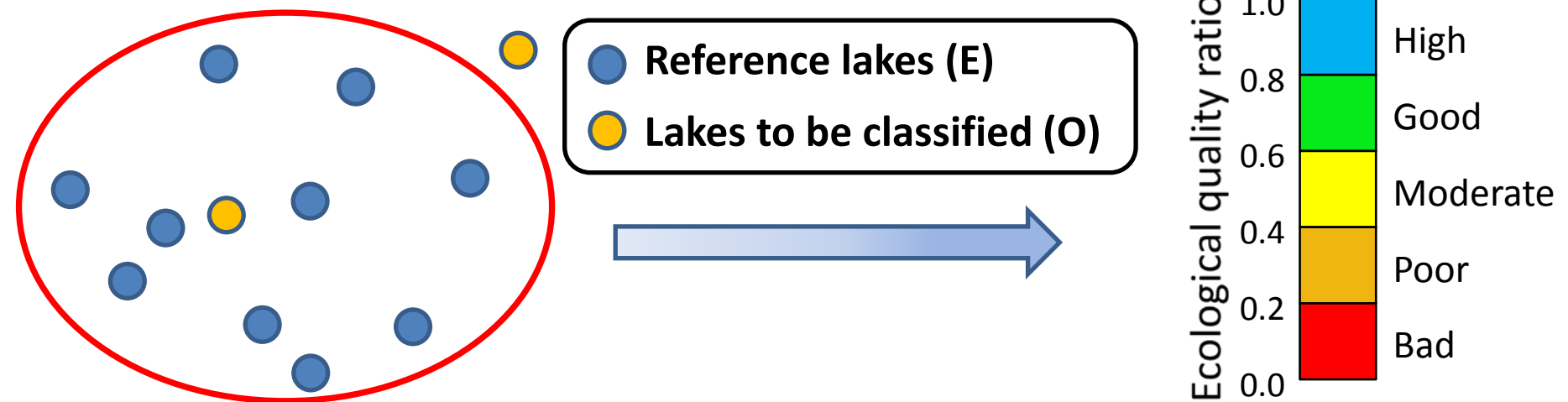
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Jyväskylä*

Arja Palomäki

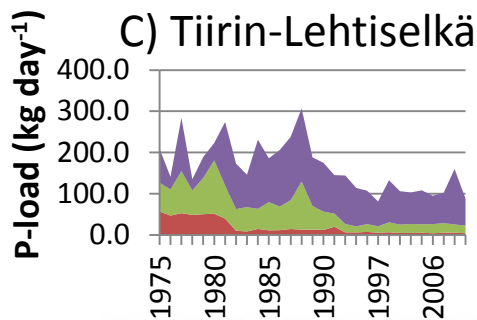
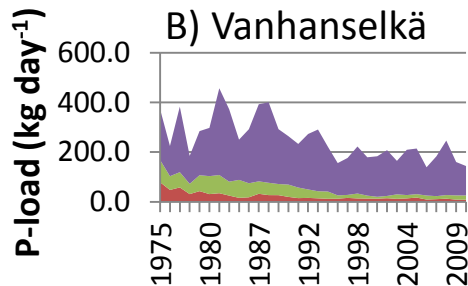
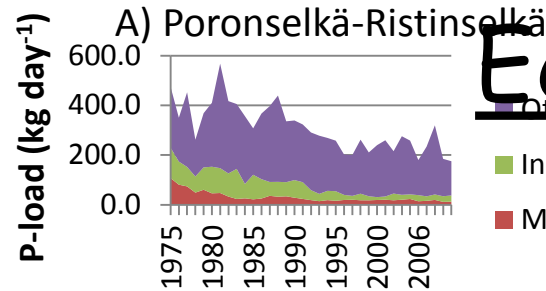
Institute for Environmental Research, University of Jyväskylä

Principles of the ecological status classification defined by WFD

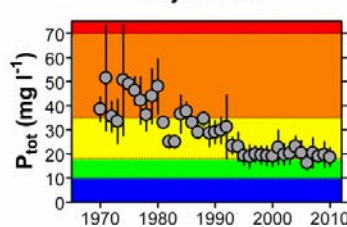
- Water Framework Directive (WFD) of the European union aims to achieve the good status of all surface waters (EC 2000)
- Ecological quality ratios are defined as the ratios between observed (O) and expected reference values (E) of the metrics ($EQR = O/E$)
- Expected reference values are usually based on the data from a group of reference lakes near their natural state



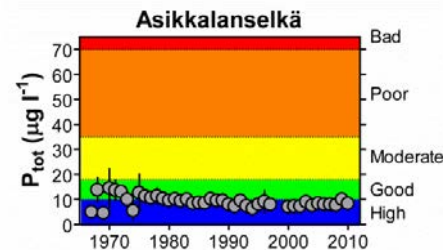
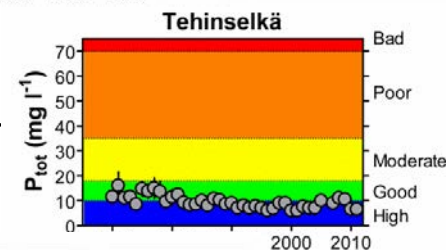
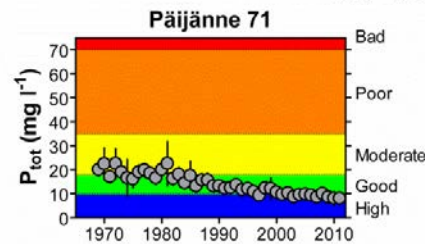
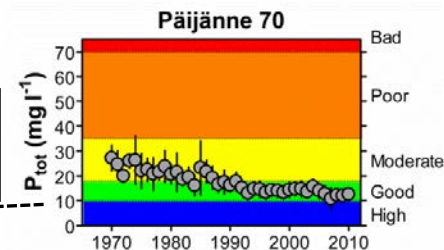
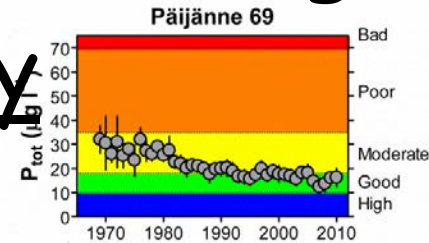
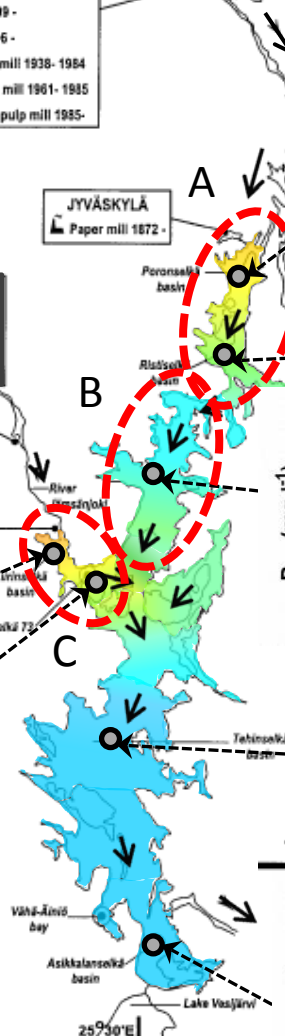
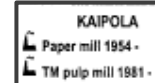
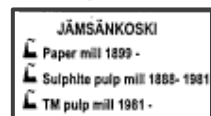
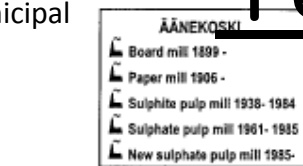
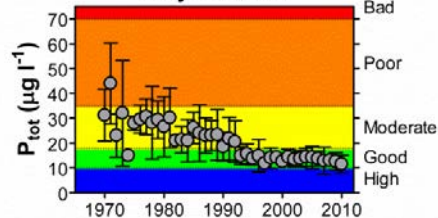
Ecological status during recovery



Päijänne 657

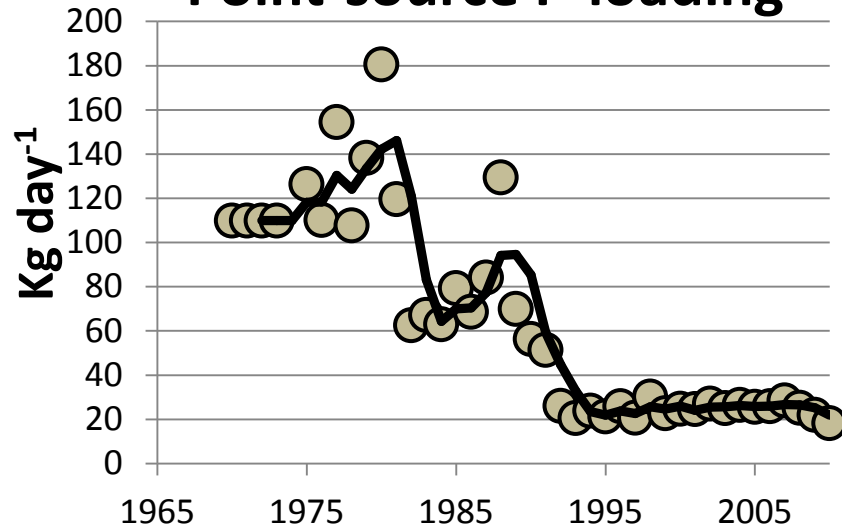


Päijänne 675

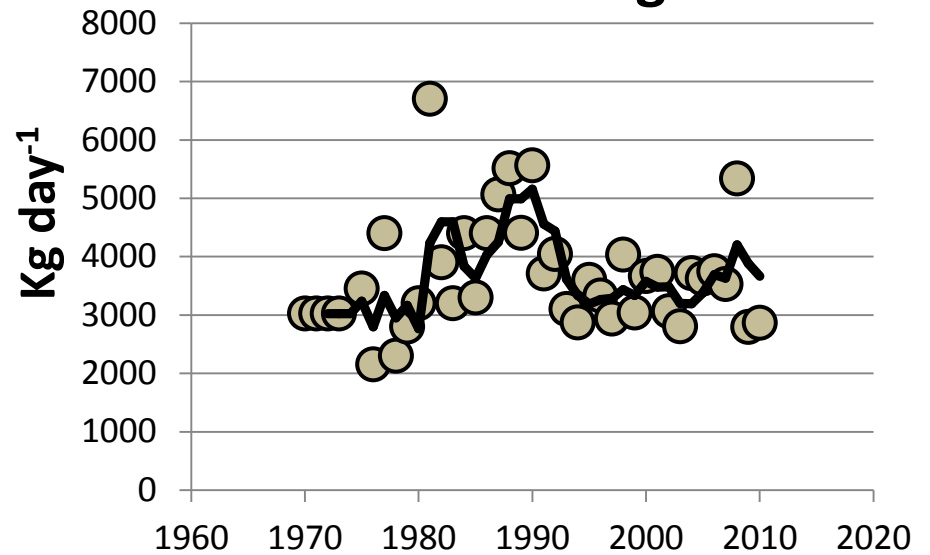


Päijänne site 675

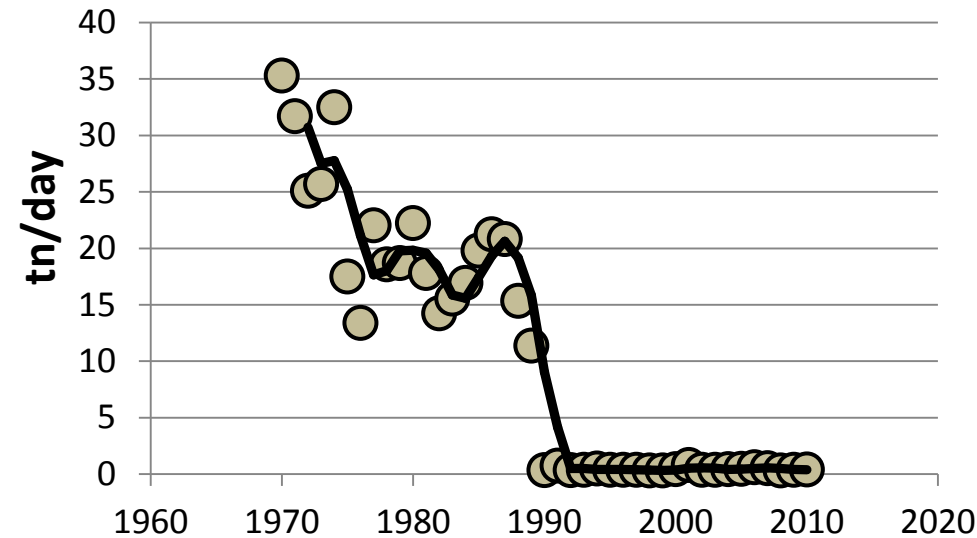
Point-source P-loading

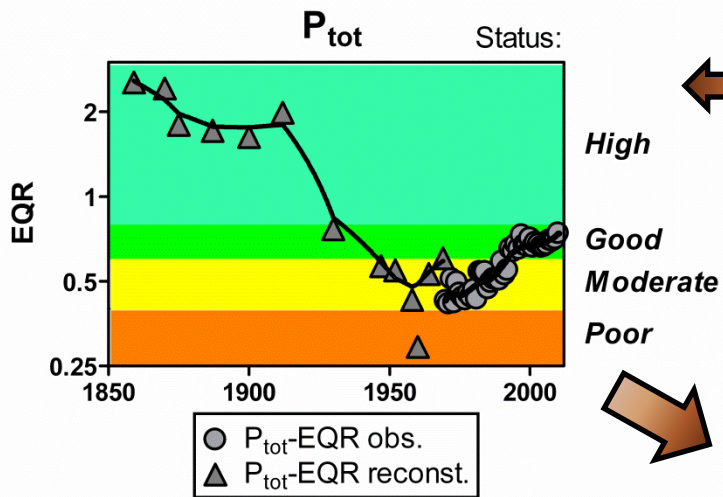


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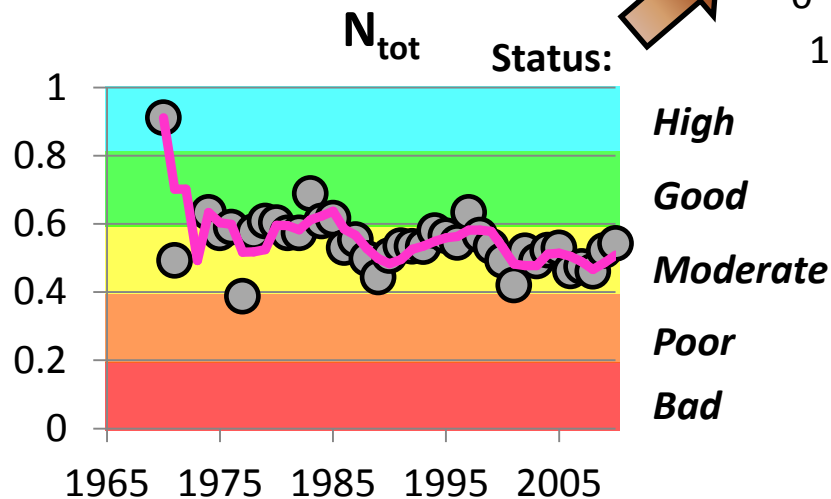
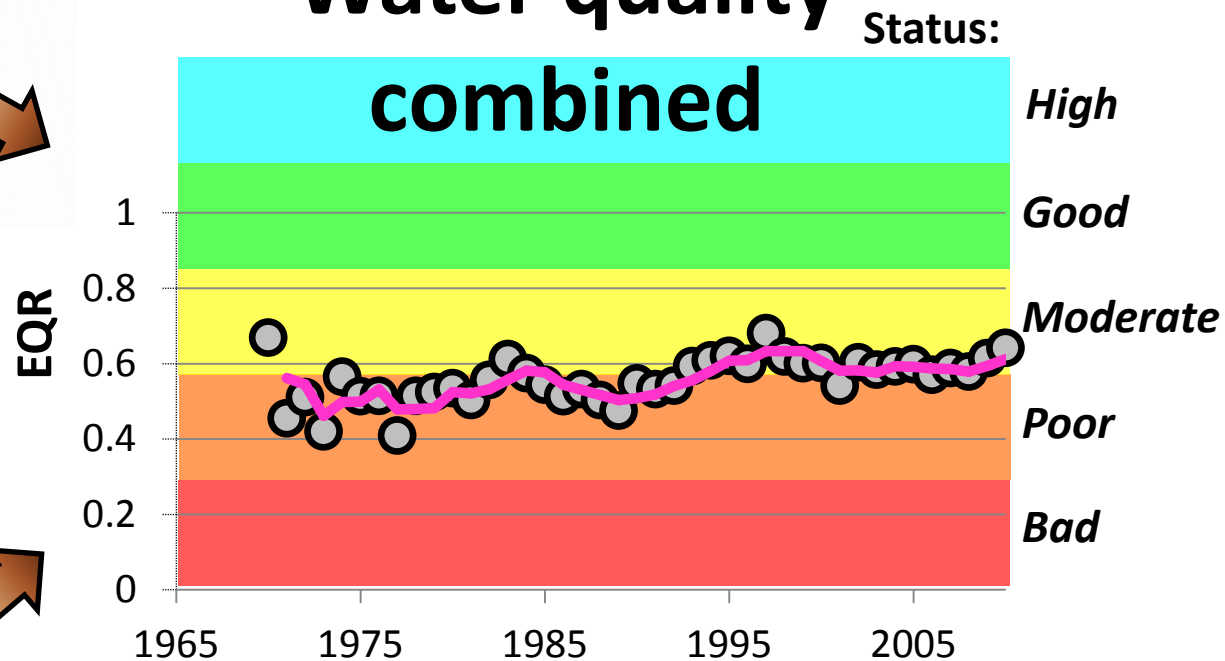
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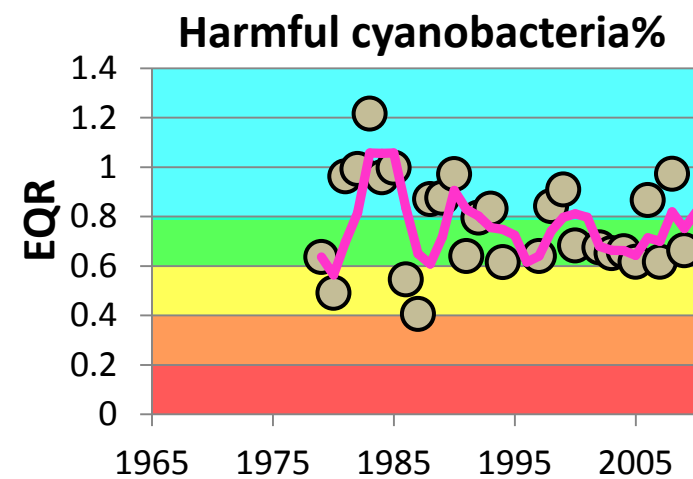
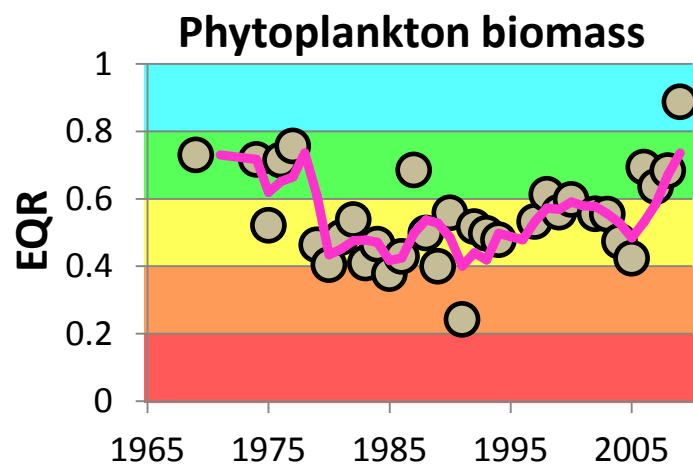
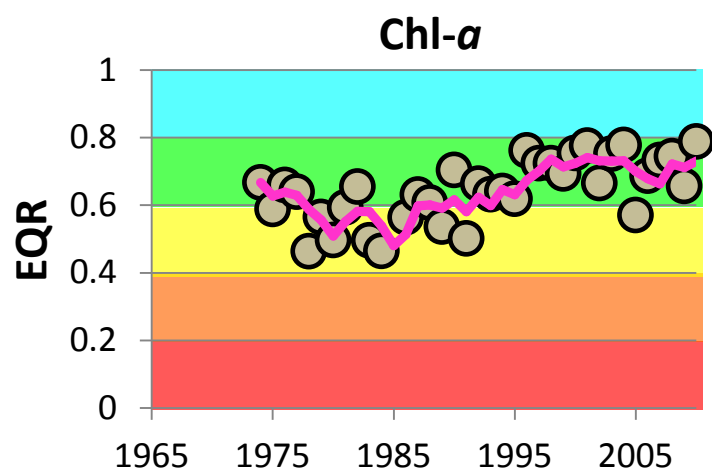




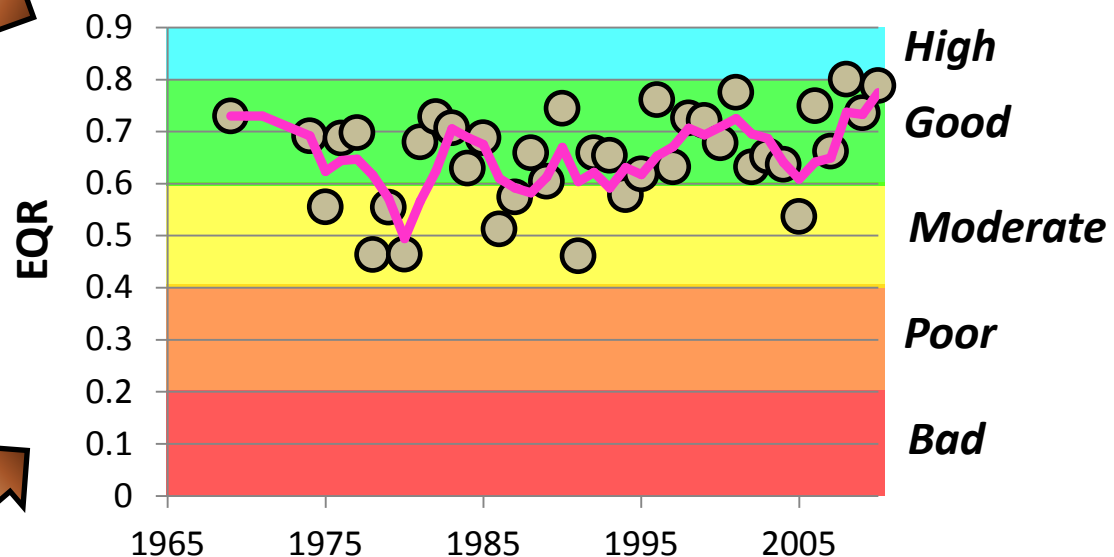
Phosphorus reconstruction based on
macroinvertebrate BQI (Verbruggen et al. 2011)

Water quality combined

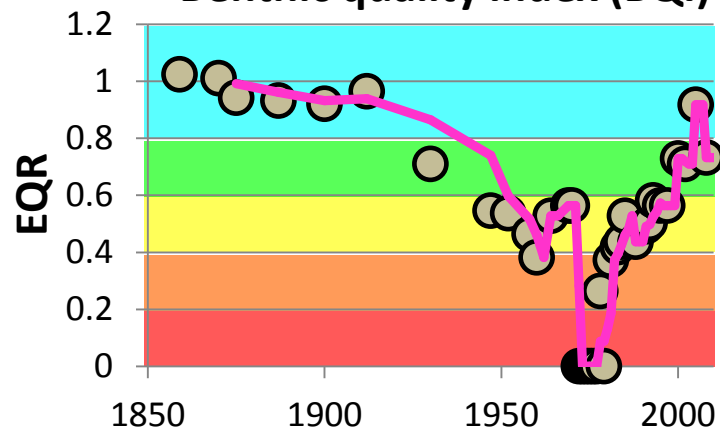




Phytoplankton combined

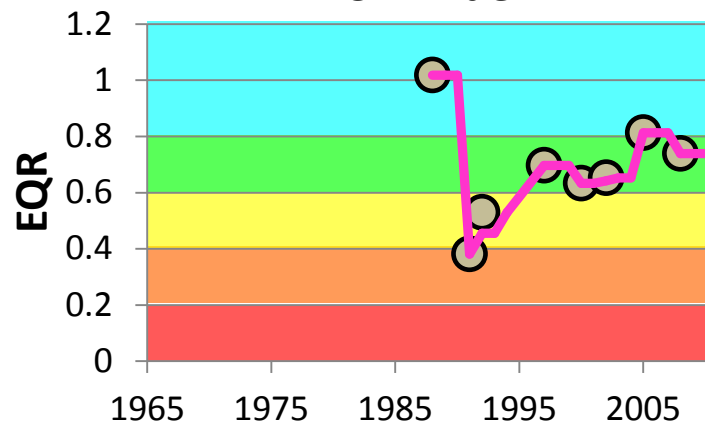


Benthic quality index (BQI)

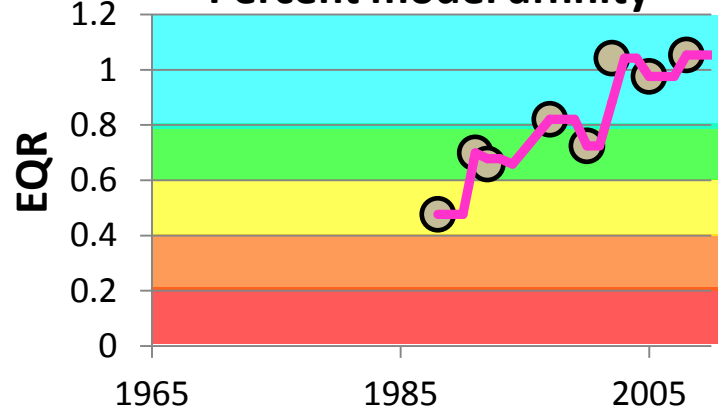


Paleolimnological (subfossil remains, Meriläinen et al. 2001) and contemporary (living invertebrate) samples combined

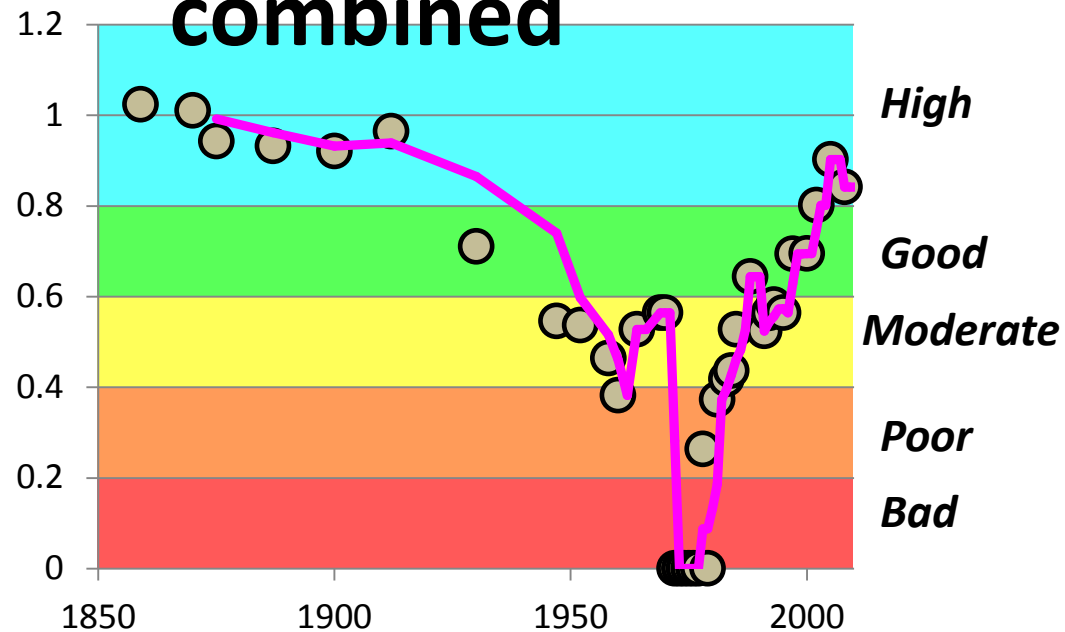
PICM-index



Percent model affinity

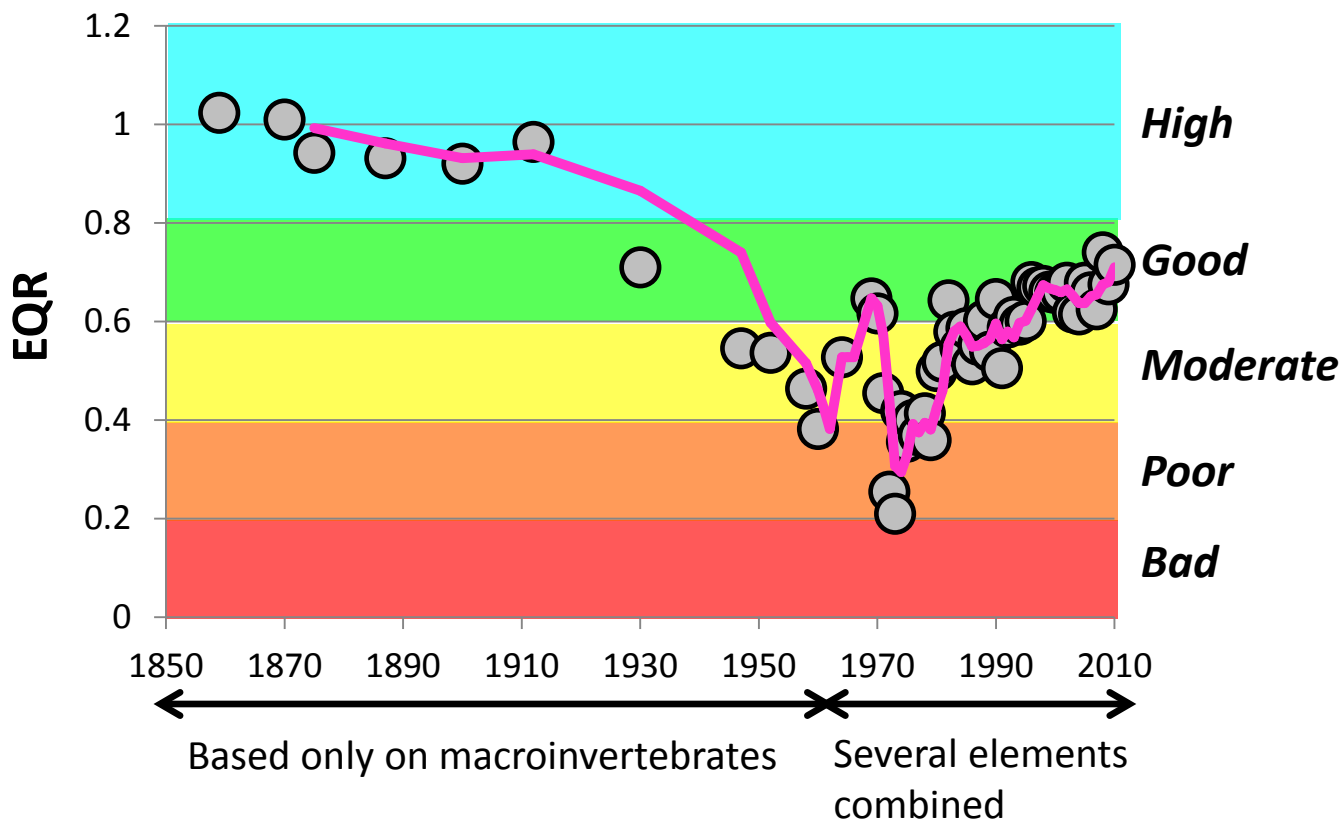


Macroinvertebrates combined



Quality elements combined

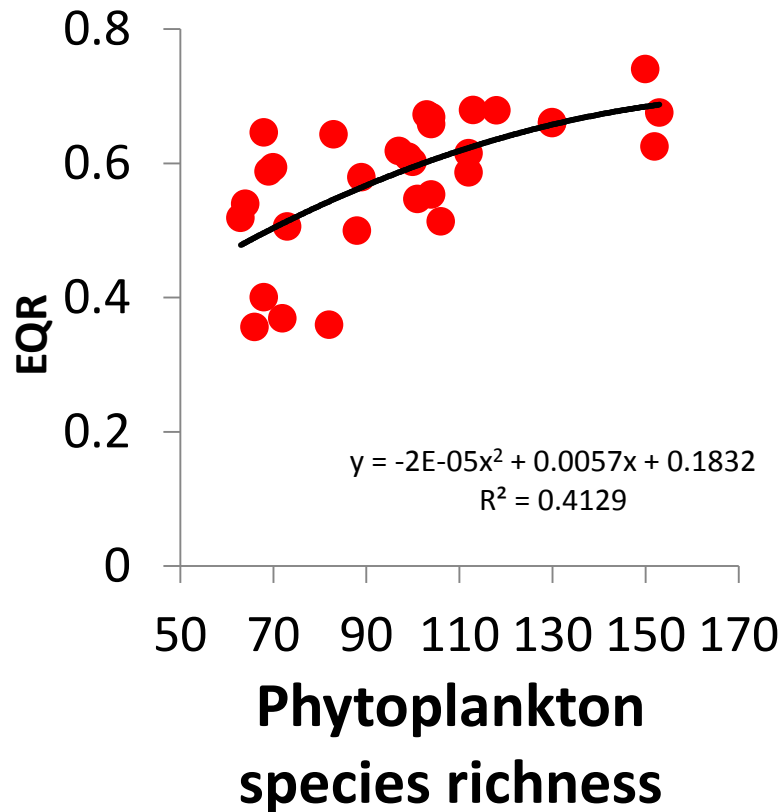
(water chemistry, phytoplankton & macroinvertebrates)



Biodiversity vs. Ecological status

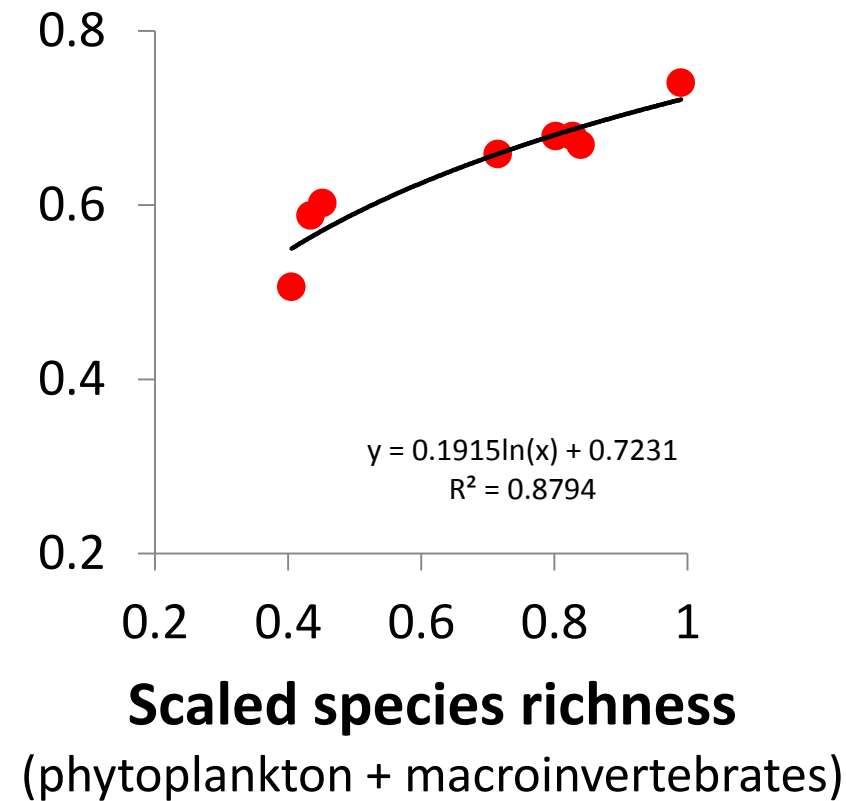
Ecological status EQR

(Quality elements combined)

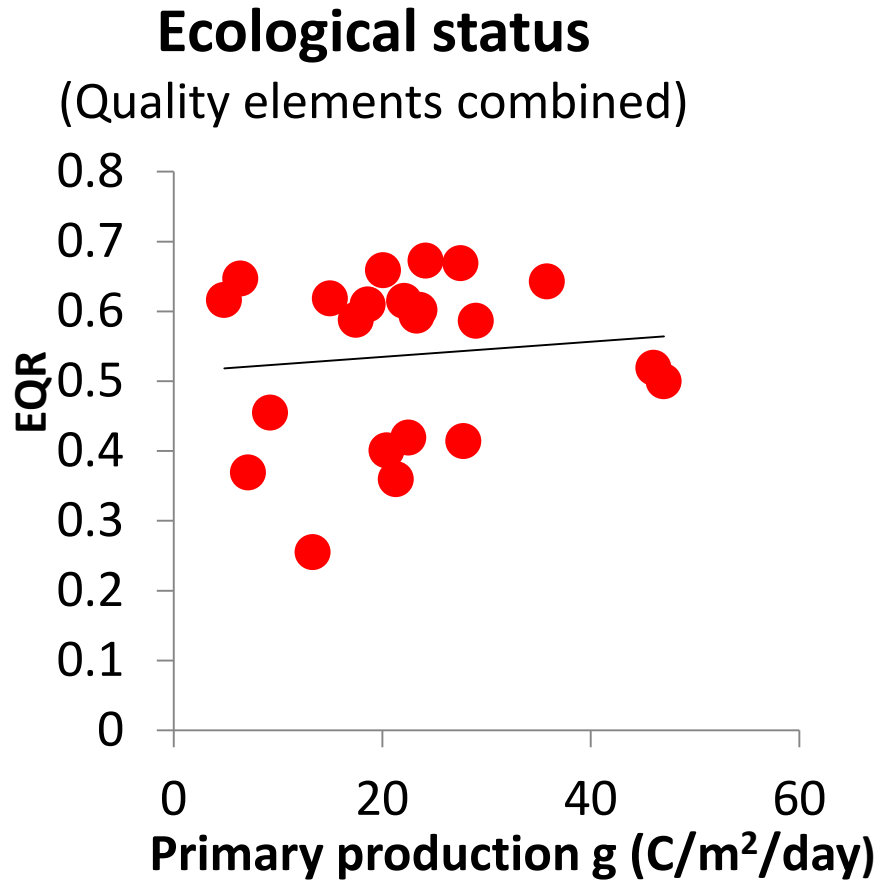
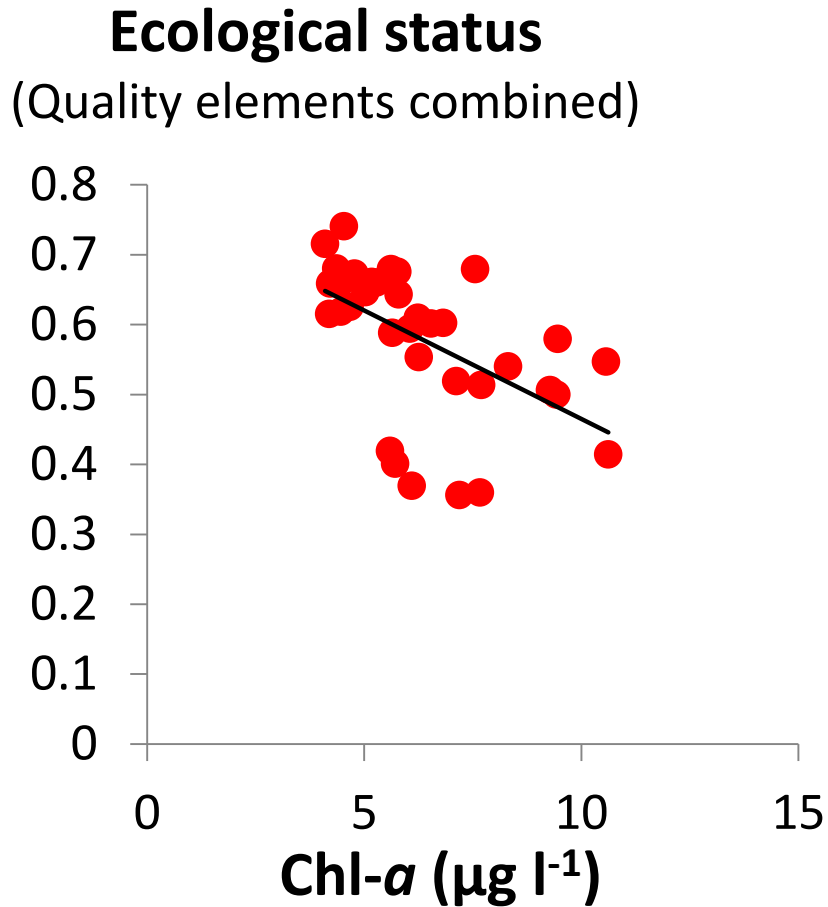


Ecological status EQR

(Quality elements combined)



Primary production vs. Ecological status



Project 14: Long-term development in the ecological status of European large lakes

Additional data from the other EnvEurope lakes ?:

- with pollution - recovery development and with similar time-series data from nutrients, phytoplankton and macroinvertebrates
- existing classification of the lake ecological status based on this data (and instructions for status classification and setting of the boundaries between status classes)
- data on primary production and biodiversity (e.g. species richness)

EnvEurope meeting in Kaunas,
21-24 May 2012