Developing guidelines for monitoring and assessment of transboundary lakes

Pertti Heinonen

Finnish Environment Institute (SYKE)

The Crowd of Environmental Monitoring
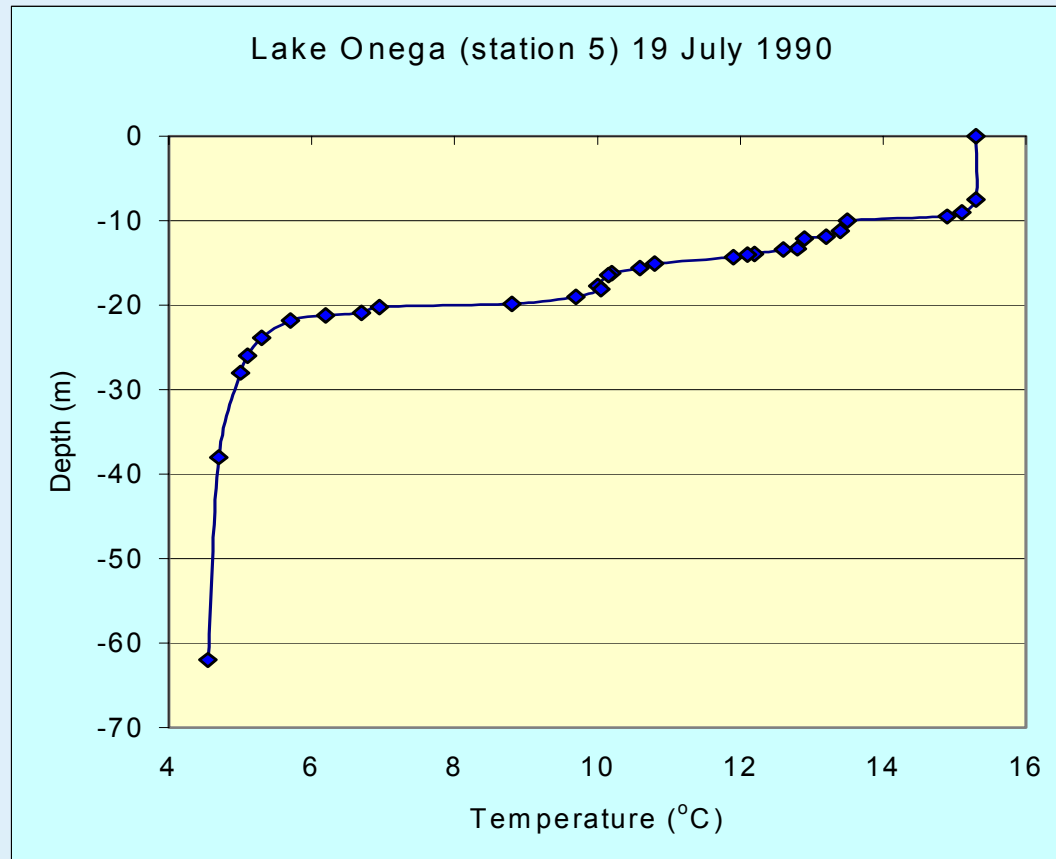
- **National monitoring programmes**
- **EUROWATERNET**
- **Global Environmental Monitoring System**
- **UN/ECE Transboundary Water Courses**
- **Water Framework Directive, other directives**
- **EUROSTAT/OECD Joint Questionnaire**

HARMONIZATION IS NEEDED!

S Y K E

The background information of the entire watershed area

- **Climate and hydrology**
- **Land use**
- **Population density in the watershed area**
- **Waste water load**
- **Non-point loading (agriculture, forestry, etc.)**

S Y K E

The summer stratification (Lake Onega, summer 1990, Filatov and Heinonen 1997).

Lake Onega (station 5) 19 July 1990

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ECOLOGICAL STATUS

- **Phytoplankton**
- **Macrophytes and phytobenthos**
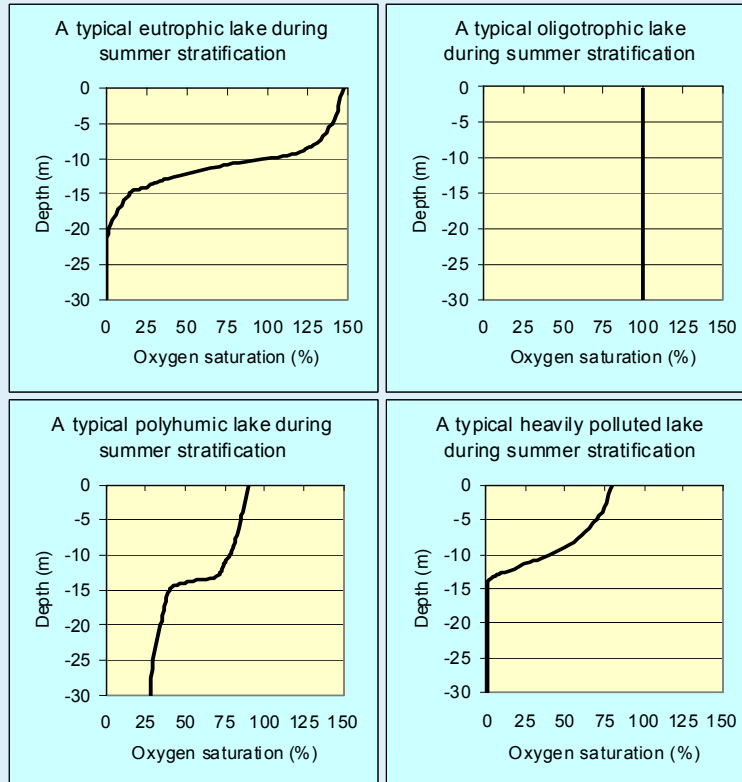- **Benthic invertebrate fauna**
- **Fishes**
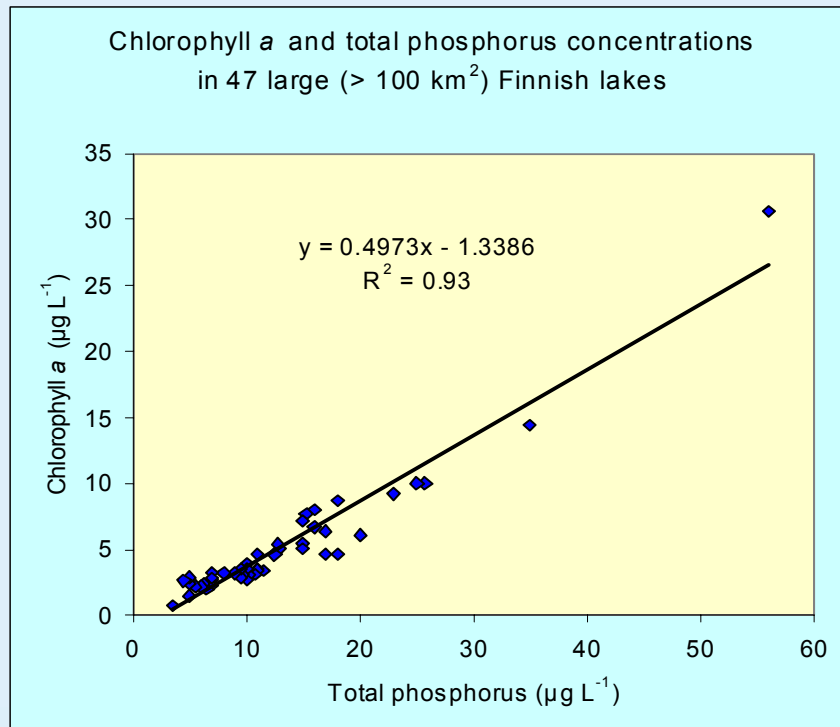
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Other topics discussed in the Guidelines

- **CHEMICAL STATUS**
- **HARMFUL SUBSTANCES**
- **MICROBIOLOGICAL QUALITY**
- **SEDIMENT**
- **RADIONUCLEAR CONTAMINATION**
- **THE ASSESSMENT AND PRESENTATION OF THE MONITORING RESULTS**

S Y K E

The oxygen status in different types of lakes

A typical eutrophic lake during summer stratification

A typical oligotrophic lake during summer stratification

A typical polyhumic lake during summer stratification

A typical heavily polluted lake during summer stratification

S Y K E

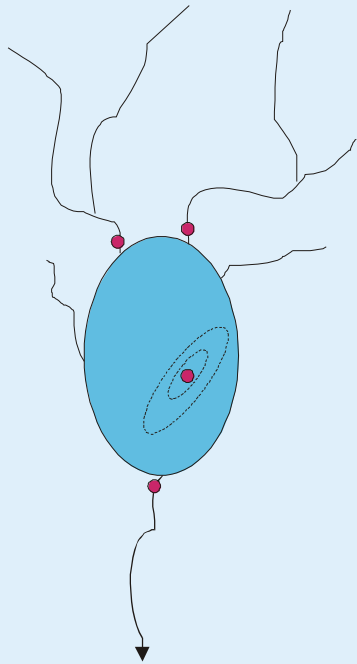# The relationship between total phosphorus and chlorophyll a concentrations in large Finnish lakes

(Pietiläinen, O.-P. and Räike, A. 2000)

Chlorophyll *a* and total phosphorus concentrations
in 47 large (> 100 km^2) Finnish lakes

$$y = 0.4973x - 1.3386$$
$$R^2 = 0.93$$

Chlorophyll *a* (μg L^{-1})

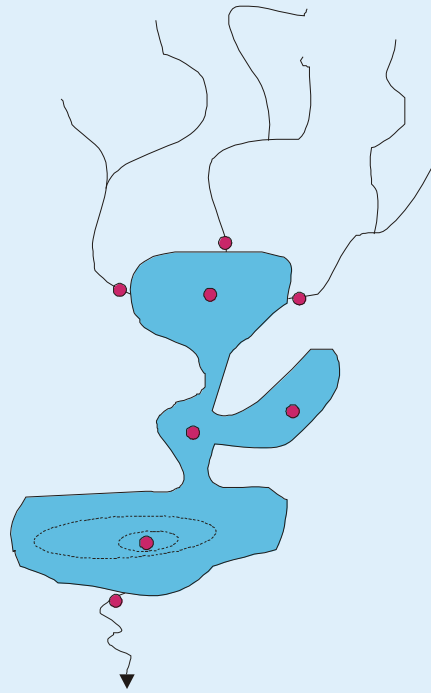Total phosphorus (μg L^{-1})

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(Almost) no pollution
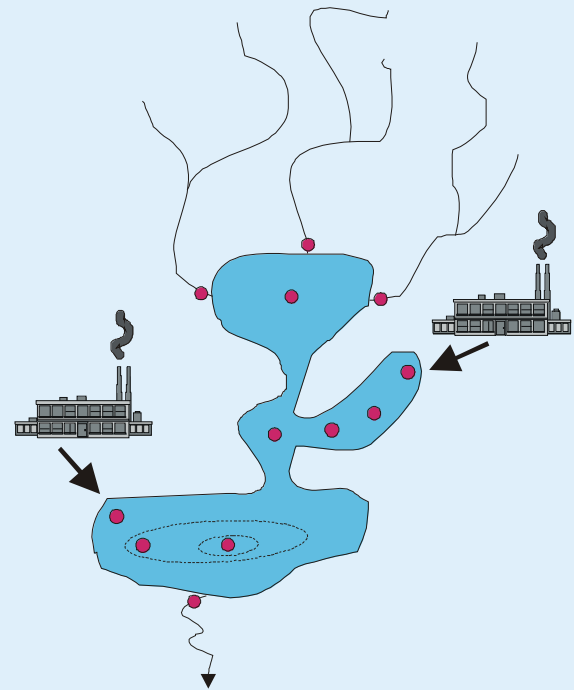
One monitoring site
in the deepest part of the lake

One monitoring site at the
mouth of each major inflowing
river and at the upper reaches
of the outflowing river

(Almost) no pollution

One monitoring site in the deepest
point of each part of the lake

One monitoring site at the
mouth of each major inflowing
river and at the outlet of the lake

Polluted by point-source loading

One monitoring site in the deepest
point of each part of the lake

Spatially and temporally frequent monitoring
in the most polluted subareas of the lake

One monitoring site at the mouth of
each major inflowing river and at
the outlet of the lake

18.4.2002

S Y K E

The Water Framework Directive divides the monitoring activity to the following three parts:

- **Operational monitoring**
- **Surveillance monitoring**
- **Investigative monitoring**

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