Lakes in Schleswig-Holstein

on their way to achieving

good ecological status ?

Lakes in Schleswig-Holstein

72 lakes > 0.5 km²

More than 500 lakes > 0.01 km²

Lake Großer Plöner See

Area: 30 km²
max. depth: 58 m

Landesamt für
Natur und Umwelt
des Landes
Schleswig-Holstein

Foto: Hott

Lake Dieksee

Area: 4 km²
max. depth: 38 m
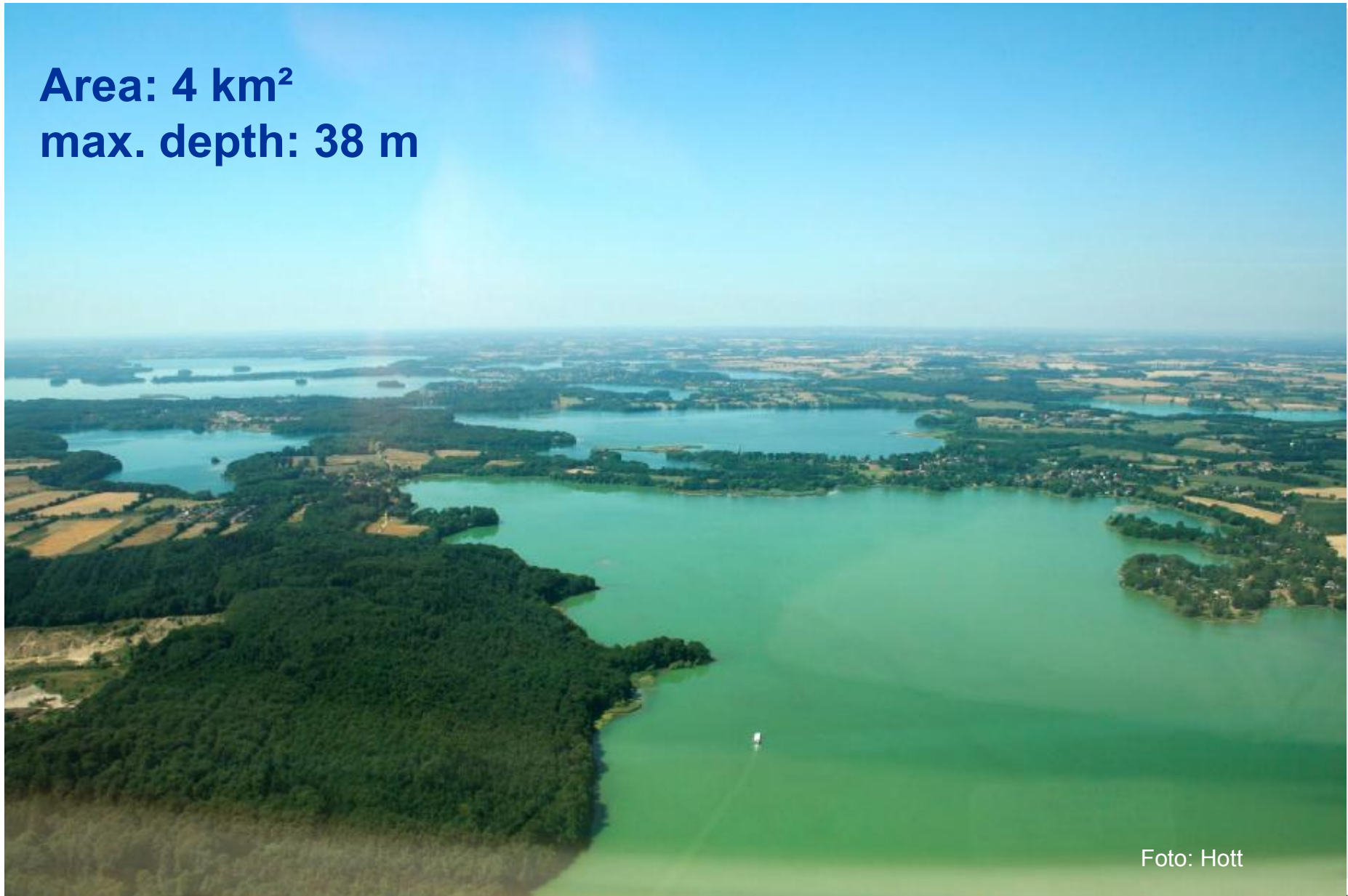
Foto: Hott

Lake Schluensee

Area: 1.3 km²
max. depth: 45 m

Foto: Hott

Lake Westensee

Area: 7 km²
max. depth: 17 m

Foto: Hott

Lake Sehlendorfer Binnensee

Area: 0.53 km²
max. depth: 1.1 m

Would you like to swim here?

EU-Water Framework Directive (WFD)
→ good ecological status by 2015

Valuation: → plant and animal communities

→ hydrological characteristics

→ chemical characteristics
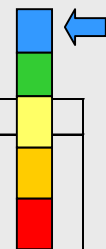
Phytoplankton/Phytobenthos
(Algae)

Makrophytes
(larger plants)

Fishes
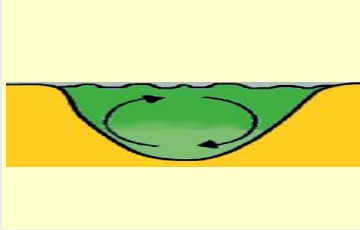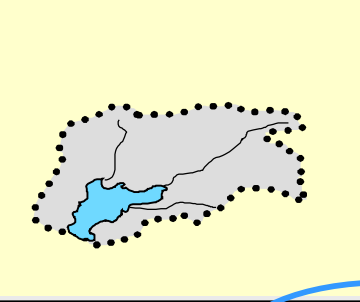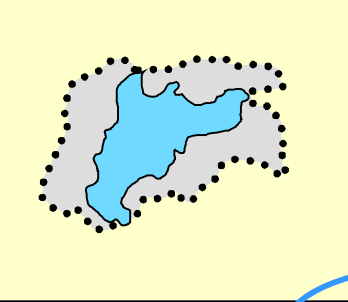
Benthic Animals
(invertebrate fauna)

What's the aim?

Good ecological status by 2015

Reference condition (near nature): high ecological status

Rich in calcium, not stratified, large river basin	Rich in calcium, stratified, small river basin
Trophy: eutrophic – rich in nutrients	**Trophy** oligotrophic – poor nutrients
Phosphorus concentration: spring: 0.020 bis 0.08 [mg/l P]	**Phosphorus** concentration: spring: < 0.012 [mg/l P]
Arenholzer See Passader See, Bordesholmer See, Postsee, Großer Eutiner See, Westensee	(Bistensee) Schaalsee, Großer Plöner See, Suhrer See, Gr. Segeberger See, Wittensee

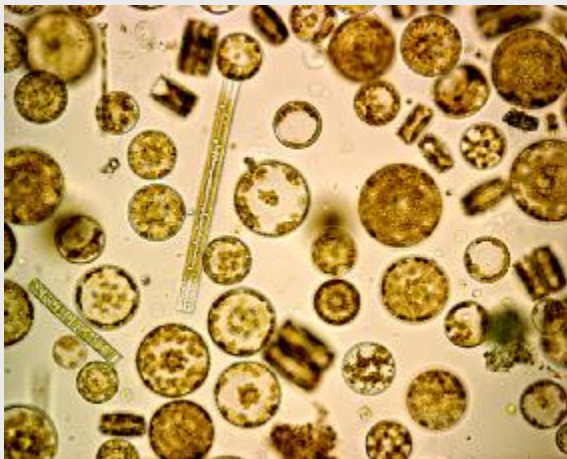# *Examples of algae*

Good ecological status
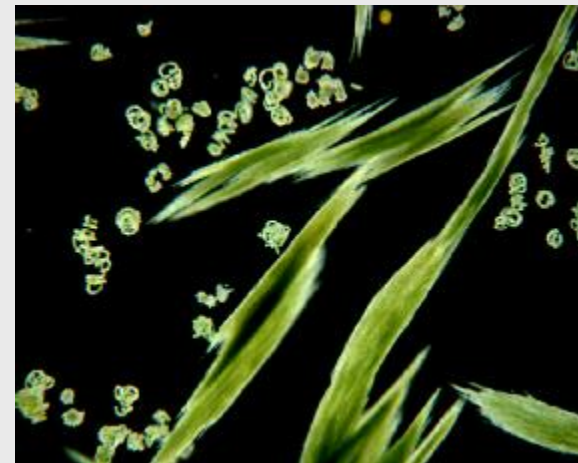
e.g. Niendorfer Binnensee
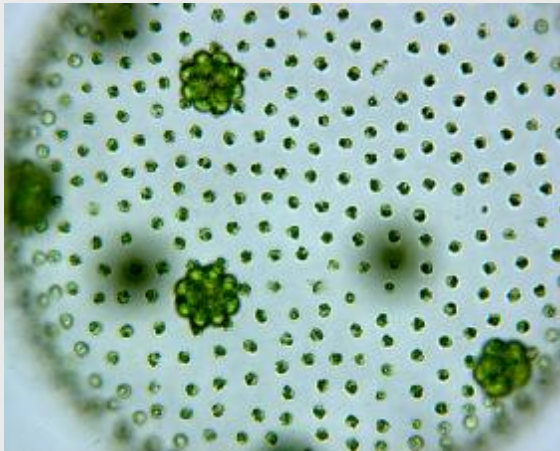
Volvox

Diatoms in spring

Moderate status

e.g. Langsee (Süderfahrenstedt)

Anabaena planctonica

Aphanizomenon flos-aquae

Examples of larger plants

Good ecological status

e.g.. for the Westensee, Arenholzer See, Lanker See

Moderate status

e.g. Schwentine Lakes

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©Foto: J. Stuhr

Macrophytes: metrics for assessment

Metric: "Reference Index" (RI) - deviation from the reference community

⇨ procedure: indicator species (submerged, floating) were arranged in 3
   classes according to their ability to tolerate different levels of degradation

- Taxa class A: species, dominating exclusively at
  reference sites

- Taxa class B: species with a wide ecological tolerance
  range (indifferent) and species occurring
  at   moderately impacted sites

- Taxa class C: degradation species, occurring mostly at
  degraded sites and only in low number
  at reference sites

A   B   C
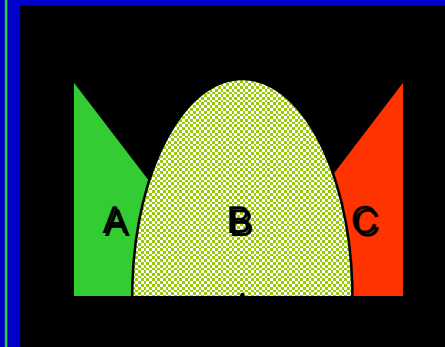
- Calculation:

$$RI = \frac{\sum \text{Taxa class A} - \sum \text{Taxa class B}}{\sum \text{taxa classes A+B+C}} \times 100$$

$\sum$ = quantity (relative macrophyte abundance³)

First characterisation of river basin

2004

artificially

"good"

Salinity /
Calcium

Achieving the aims
unclear / unlikely
- high input of nutrients -

Summer

Chlorophyll a (µg/l)

1000

100

10

1

0,01   0,1   1   10

Total Phosphorus (mg/l)
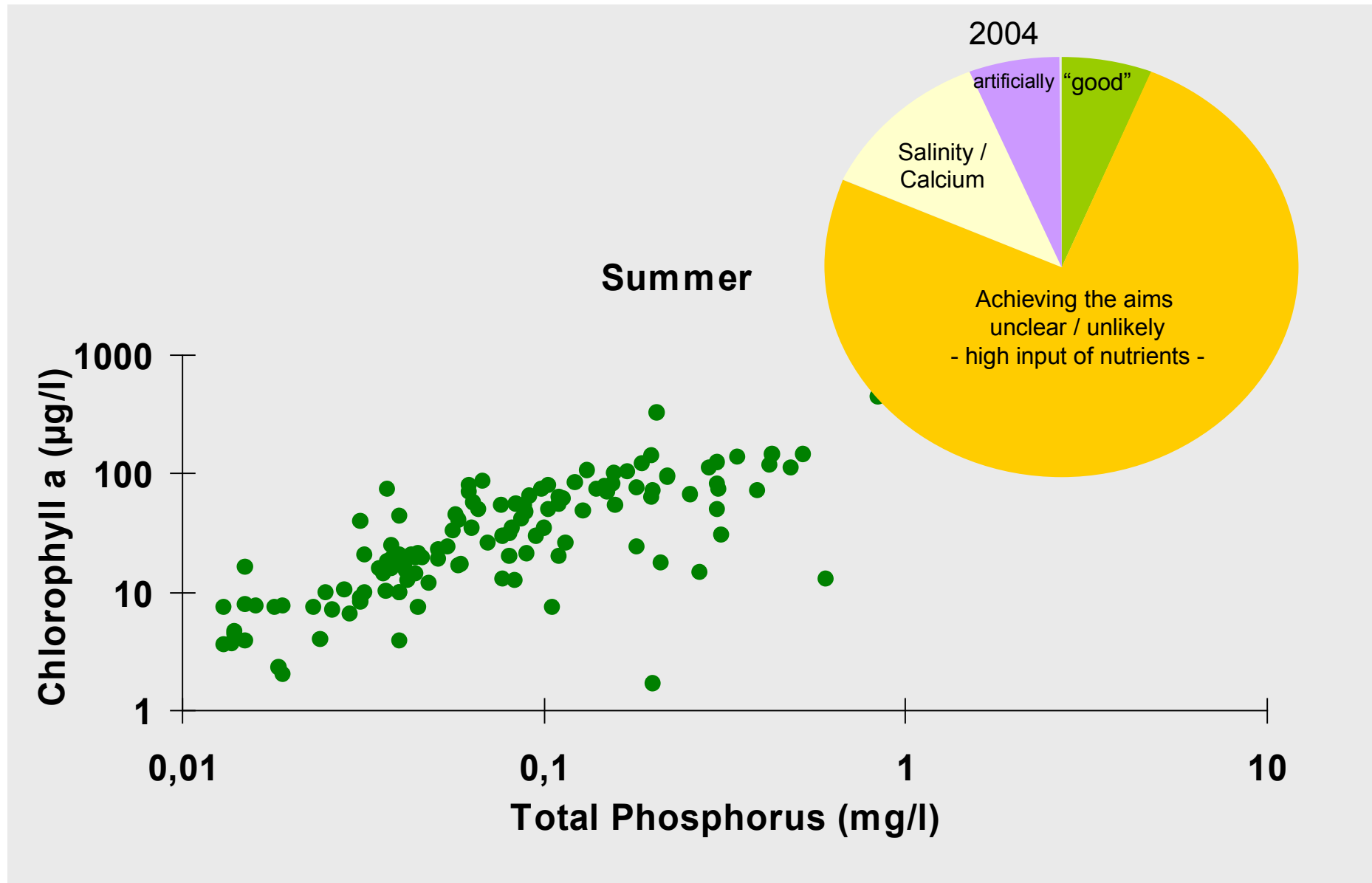
Impacts

Disturbance of plants and animals by

1. High input of nutrients caused by
  → diffuse sources
  → point sources
  → higher input in former times

2. Fundamental change in chemistry

  → enrichment of calcium (poor in calcium => rich in calcium)

  → decreasing salinity by interrupting the connection between lake
    and the Baltic Sea

3. barriers in in- and outlets so that fish cannot pass.

4. Changes to shores

5. Changes in water level in lakes

6. Changes in fish community

Impacts

High input of nutrients from diffuse sources
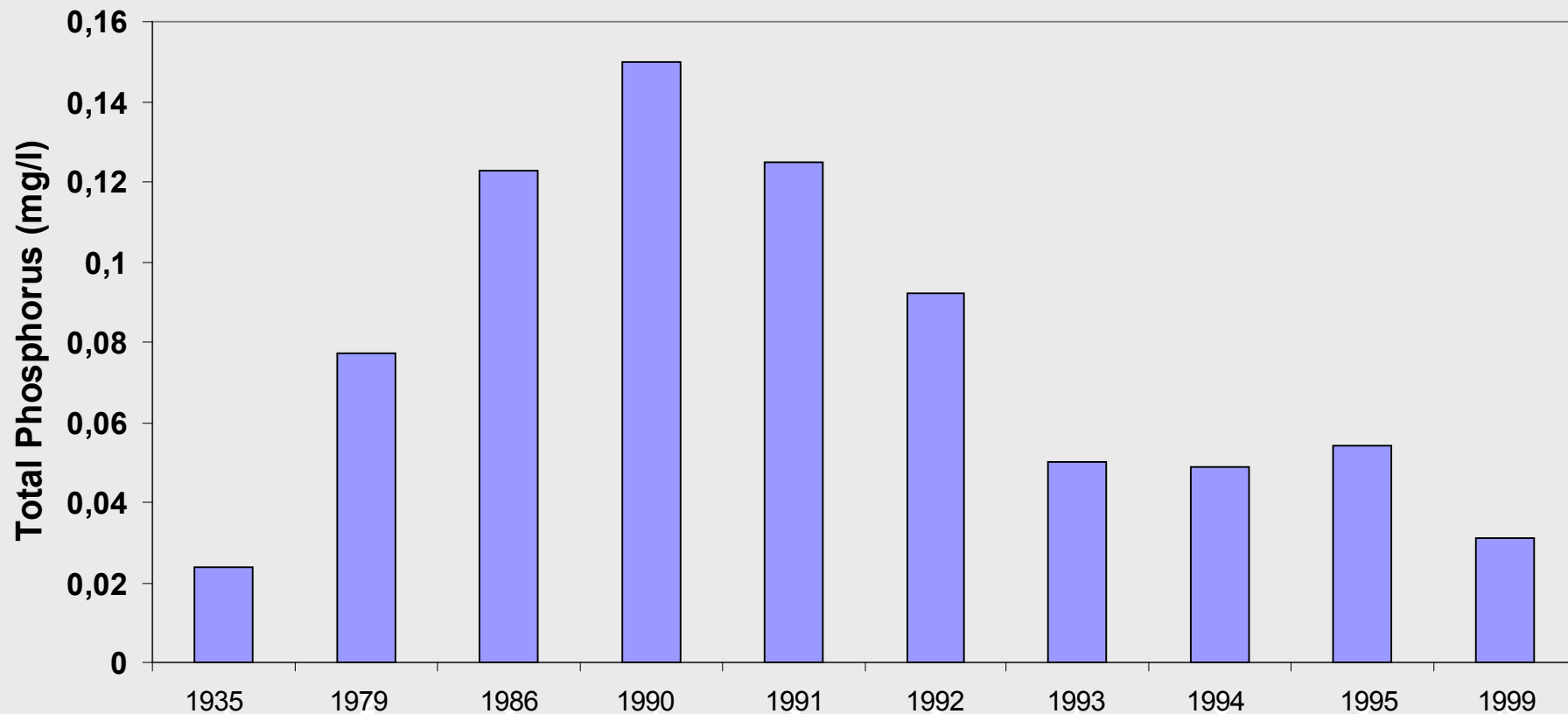
(most important for most lakes)

Possible measure

Recovery of Lake Schleinsee by extensive management of 25 % of its drainage basin

Schleinsee (south Germany)

(veränd. nach Strehle & Trautmann 2005)

Impacts

High input of nutrients from diffuse sources

Foto: Krone, BGR

Possible measure

Management without using a plough

Possible measure

Buffer zone

Foto: Aktion Fischotterschutz

Possible measure

Leaching of drainage water into "ponds" at the end of a slope

Possible measure

Leaching of drainage water onto the surface of adjoining wetlands

©Foto: J. Stuhr

Impacts

Intensive use of grasslands

Possible measure

Change in management, extensive use of grasslands

Impacts

High input of nutrients from point sources

- waste water treatment plants

- urban run-off

- fertiliser from adjoining gardens

- baiting by anglers

Impacts

Decrease in reeds by a combination of several causes (changed water level, eutrophication, birds, direct destruction)

Users of shoreline:

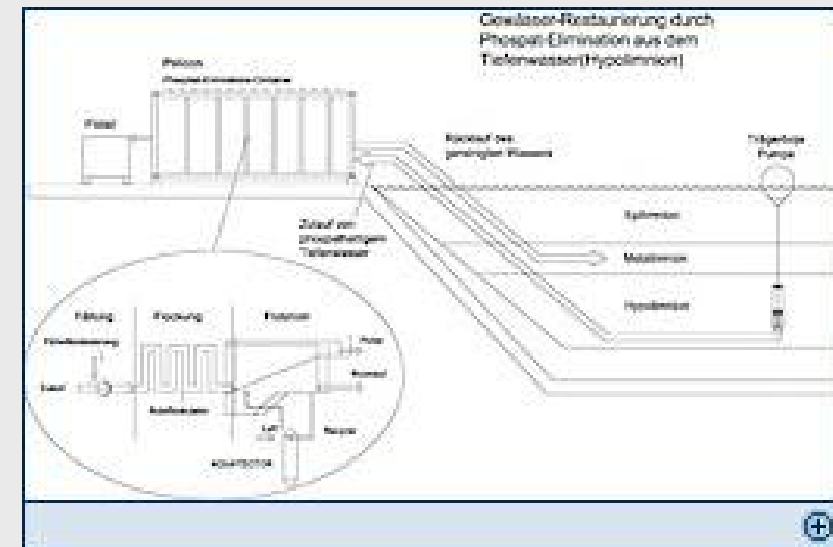livestock, anglers, surfers, boats etc

Technical measures

High nutrient concentrations in the lake as a result of higher input in former times

Measures within the lake <u>after</u> improvement in the drainage basin

-> acceleration of recovery

- treatment or drainage of deep water

- treatment of sediments

- bio-manipulation
  (promotion of predatory fish)

Measures at the inlet

- withdrawal of phosphorus (chemical precipitation, leaching over wetlands)

Are all water bodies able to achieve the aims?

WFD § 4 environmental objective -> good ecological status

Exceptions possible:

(4) Extension of deadlines (2021, 2027)

❖ technical feasibility

❖ disproportionate costs

❖ natural conditions

(5) Less stringent objectives

❖ natural conditions

❖ disproportionate costs

(3) Heavily modified waters because of hydromorphologic changes
    (e.g. regulated rivers)

You want to know more?

Click here:

www.wasser.sh
www.umweltatlas-sh.de

!?

Thank you for your attention !