

# ***Lakes in Schleswig-Holstein***

***on their way to achieving  
good ecological status ?***

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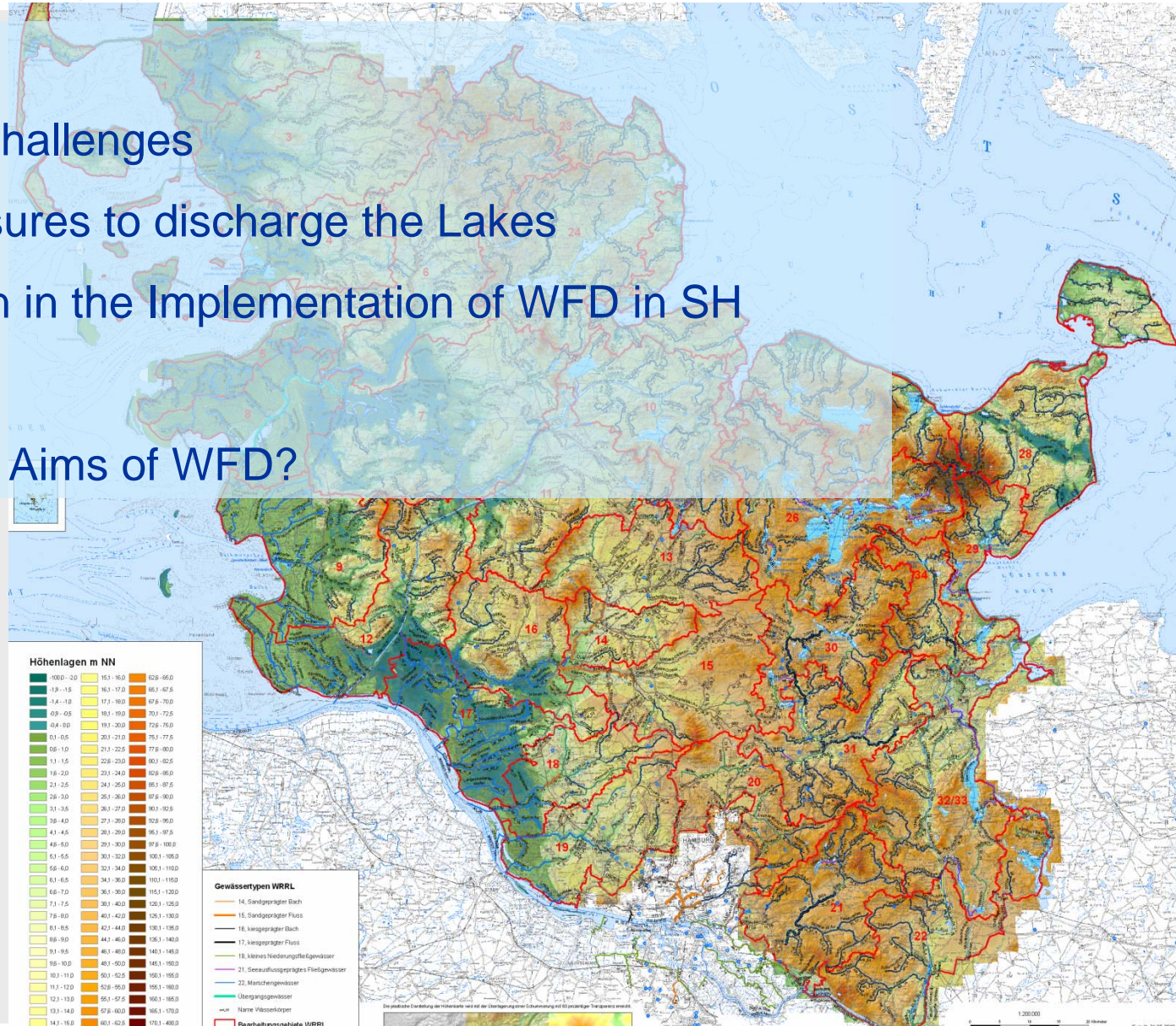
State Agency for Agriculture, Environment and Rural Area (LLUR)

Section Lakes



# Implementation of WFD in Lakes in Schleswig-Holstein

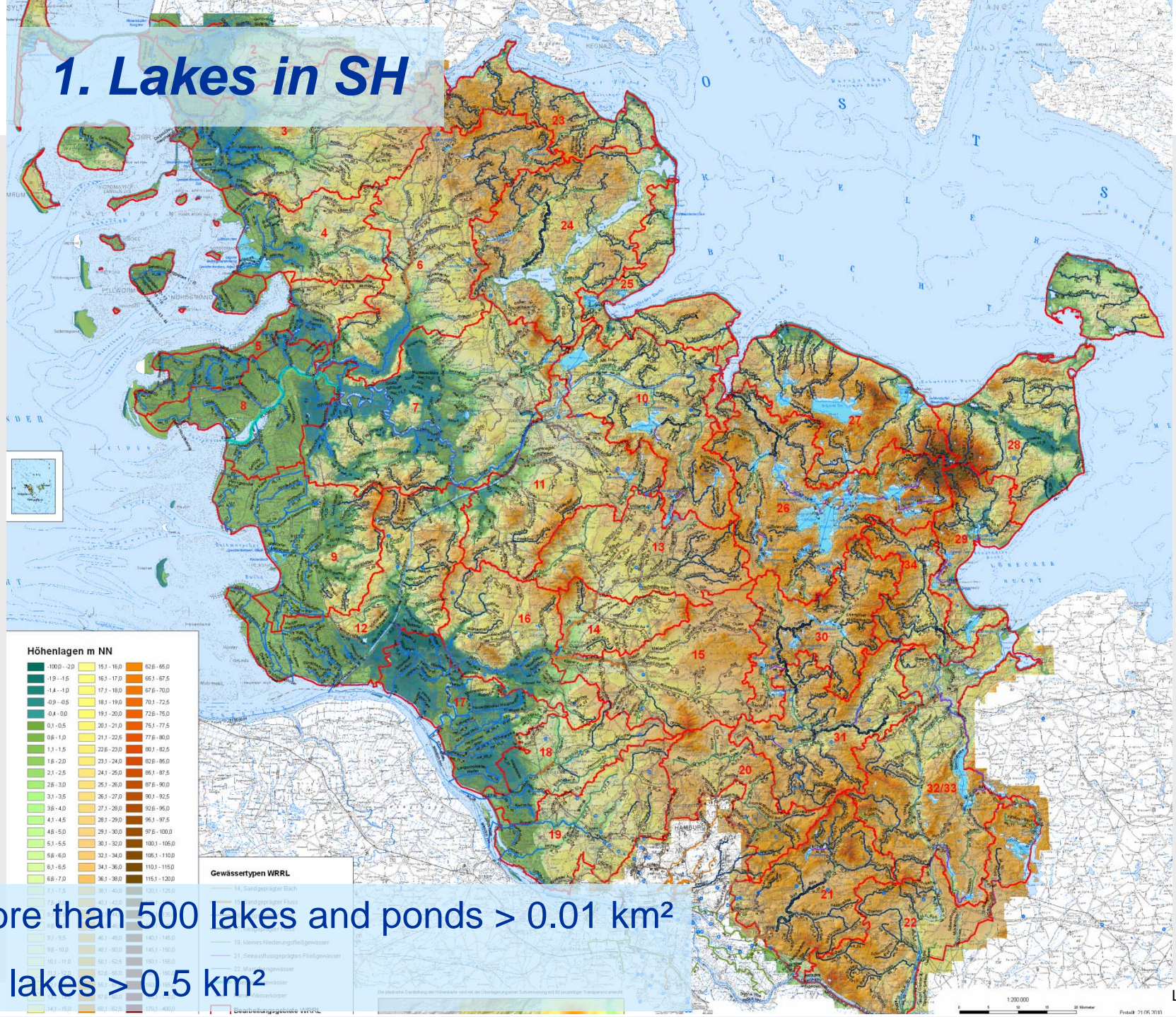
1. Lakes in SH
2. Impacts and Challenges
3. Possible Measures to discharge the Lakes
4. Role Allocation in the Implementation of WFD in SH
5. Key Activities
6. Achieving the Aims of WFD?







# 1. Lakes in SH





# 1. Lakes in SH

## ➤ Lake Großer Plöner See

greatest and deapest:

Area: 30 km<sup>2</sup>

max. depth: 58 m



Foto: Hott



# 1. Lakes in SH

## ➤ Lake Dieksee

Area: 4 km<sup>2</sup>

max. depth: 38 m



Foto: Hott



# 1. Lakes in SH

## ➤ Lake Schluensee: One of the „good“ lakes

Area: 1.3 km<sup>2</sup>  
max. depth: 45 m



Foto: Hott



# 1. Lakes in SH

## ➤ Lake Sehlendorfer Binnensee: brackish lake

Area: 0.53 km<sup>2</sup>

max. depth: 1.1 m





# 1. Lakes in SH

## ➤ Problems...



*Would you like to swim here?*



# EG-Water Framework Directive (WFD)

Landesamt für Landwirtschaft,  
Umwelt und ländliche Räume  
Schleswig-Holstein



→ good ecological status by 2015

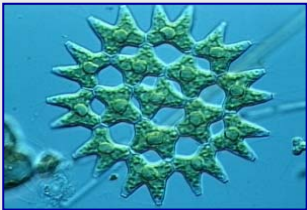
Valuation: → plant and animal communities  
→ hydrological characteristics  
→ chemical characteristics

Supports also the aims of

➤ Nature 2000



➤ Bathingwater directive



Phytoplankton/Phytobenthos  
(Algae)



Makrophytes  
(larger plants)



Fishes



Benthic Animals  
(invertebrate fauna)

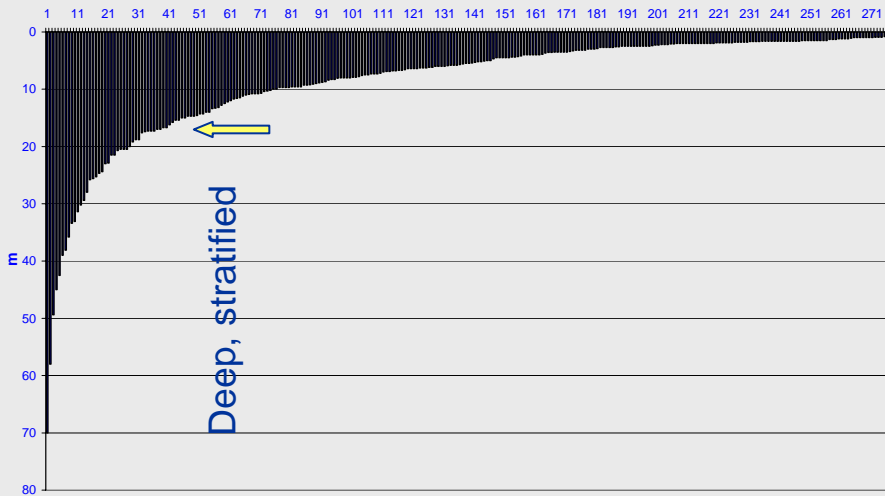




# 1. Lakes in SH

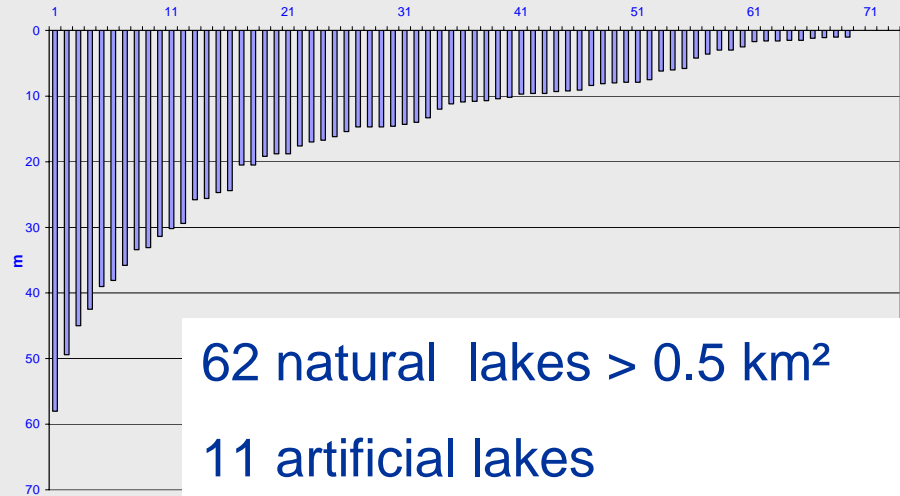
More than 300 lakes  $> 0.01 \text{ km}^2$

Max. depth



WFD: 73 lakes  $> 0.5 \text{ km}^2$

Max. depth



62 natural lakes  $> 0.5 \text{ km}^2$

11 artificial lakes

0 heavily modified lakes



49 lakes also NATURA 2000

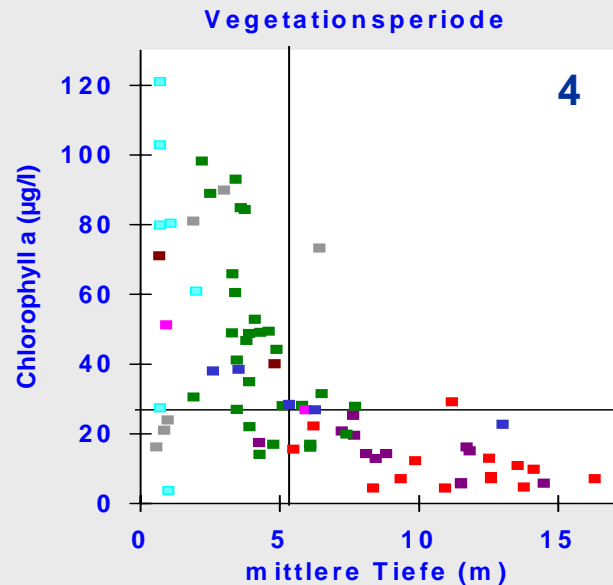
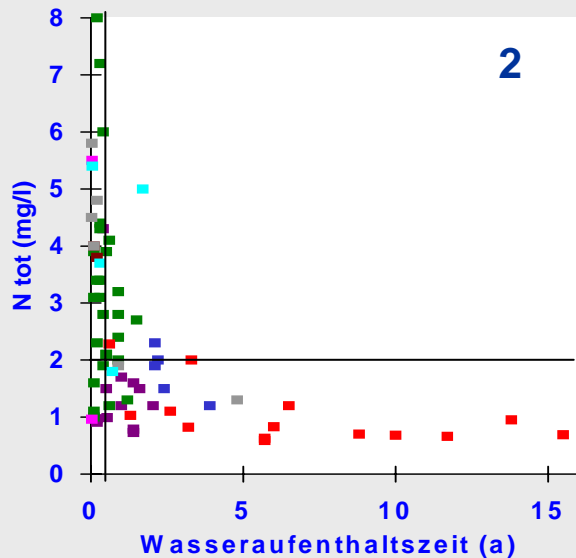
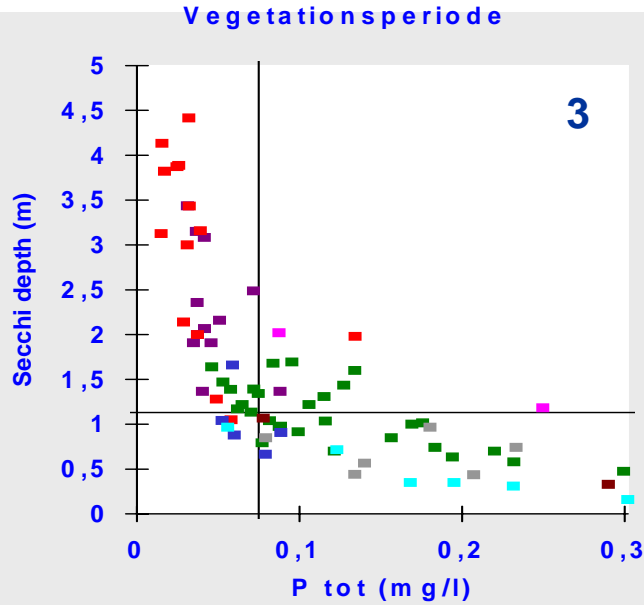
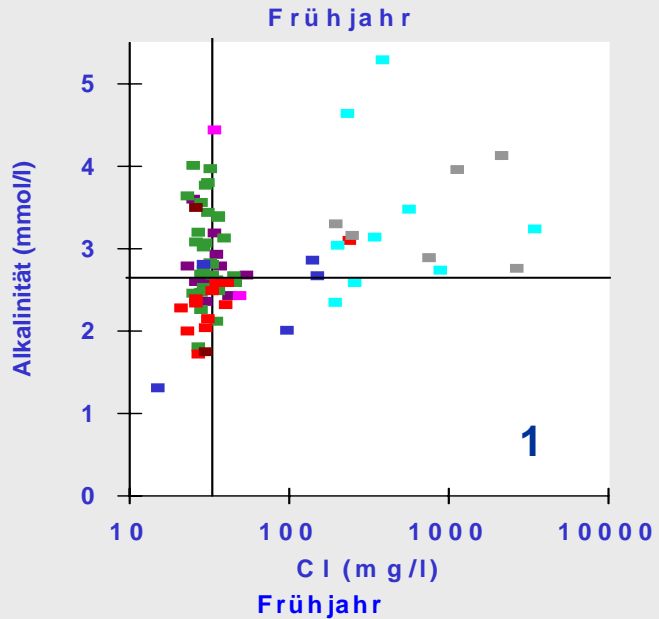


48 lakes with bathing area



# 1. Lakes in SH

## ➤ Physics, Chemistry



73 lakes > 0.5 km<sup>2</sup>

- Type 10: ■  
stratified, large drainage basin
- Type 13: ■  
stratified, small drainage basin
- Type 11: ■  
not stratified, large drainage basin
- Type 88.1: ■  
lakes near baltic coast
- Type 99: ■  
lakes near north sea,  
mostly artificial

— Median



## 2. *Impacts* – Point Sources

Input of nutrients from point sources

- waste water treatment plants
- urban run-off
- fertiliser from adjoining gardens
- baiting by anglers





## 2. *Impacts* – Diffuse Input



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



High input of nutrients from erosion

Foto: Krone, BGR

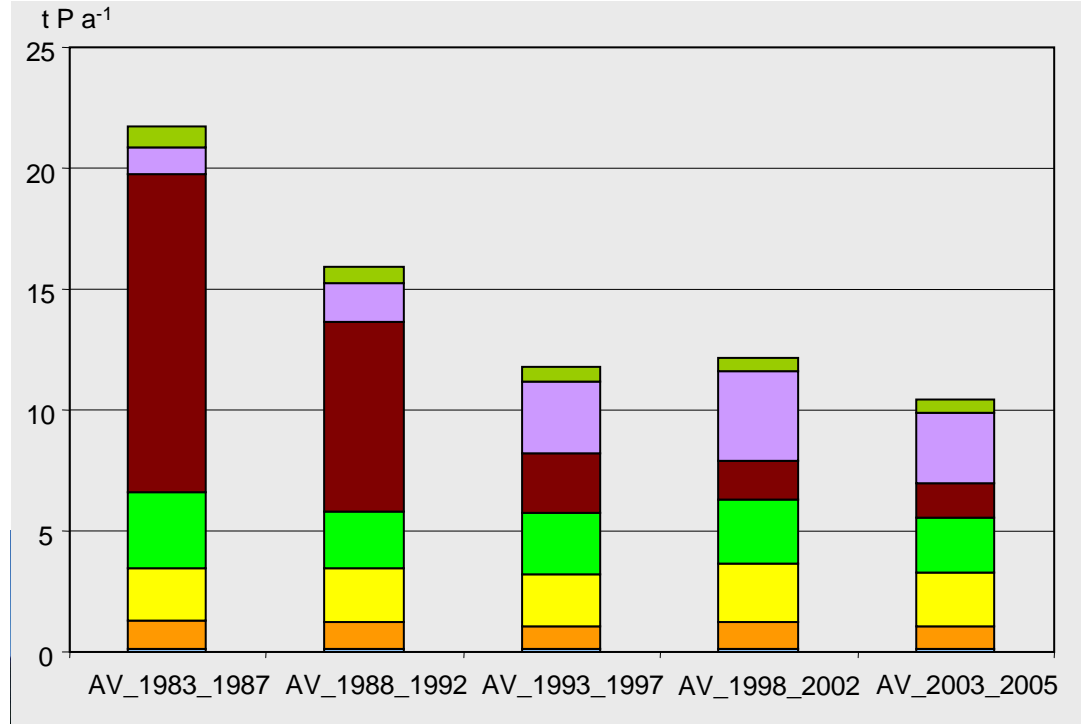


Intensive use of grasslands



## 2. Impacts

### Sources of Nutrients: Phosphorus



#### Pathways in a river basin in SH

- urban runoff
- Surface runoff
- wastewater
- groundwater
- erosion
- drainage
- atmospheric deposition

Daten: UBA

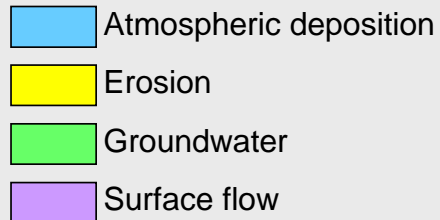
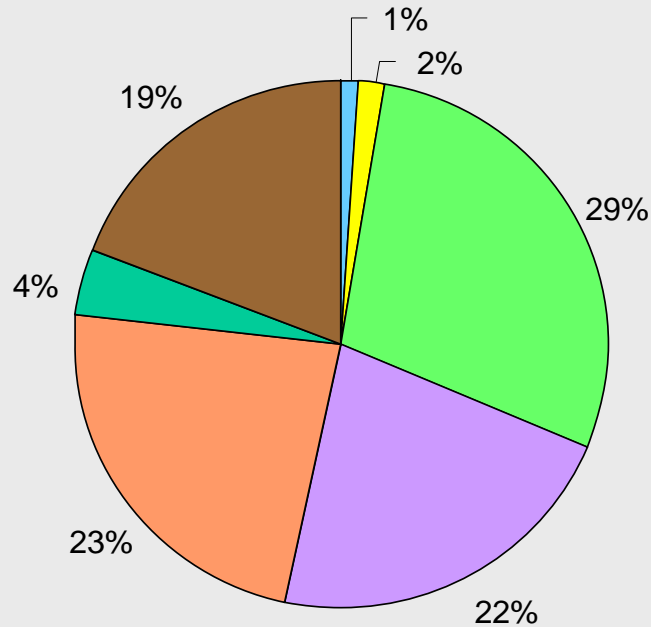




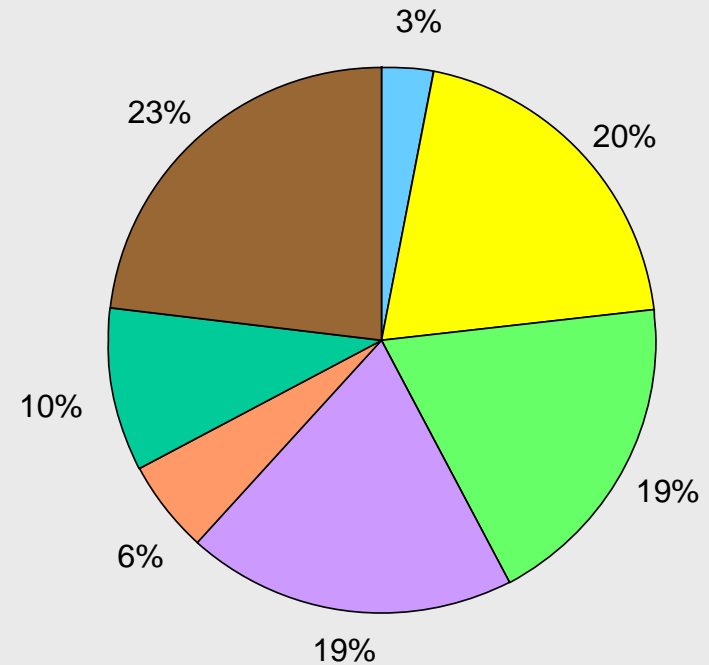
## 2. Impacts: Pathways of Input



Middle part – „Geest“



Hilly eastern part



Data: UBA, modell MONERIS

## 2. Impacts

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

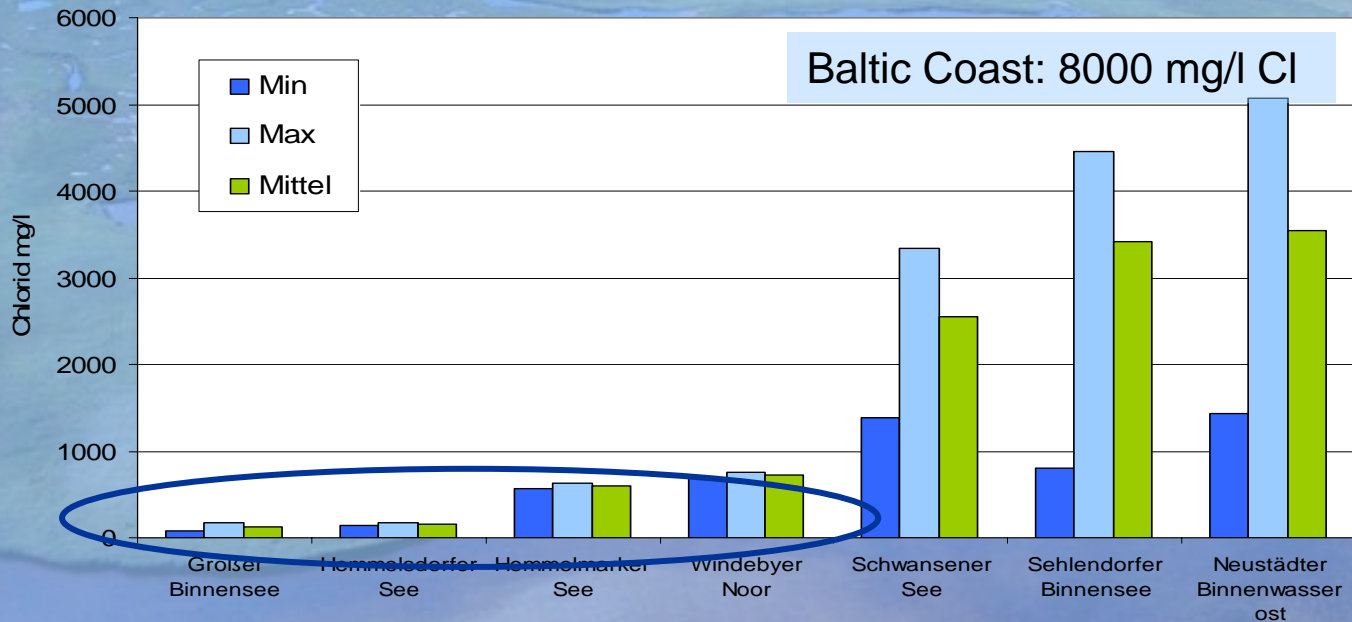


Users of shoreline:

livestock, anglers, surfers, boats etc



## 2. Impacts - Sluices





### 3. Possible Measures – Diffuse Sources:



most lakes



Management without using a  
plough





### 3. Possible Measures - Shores



P  
M/P  
F  
ÖZK

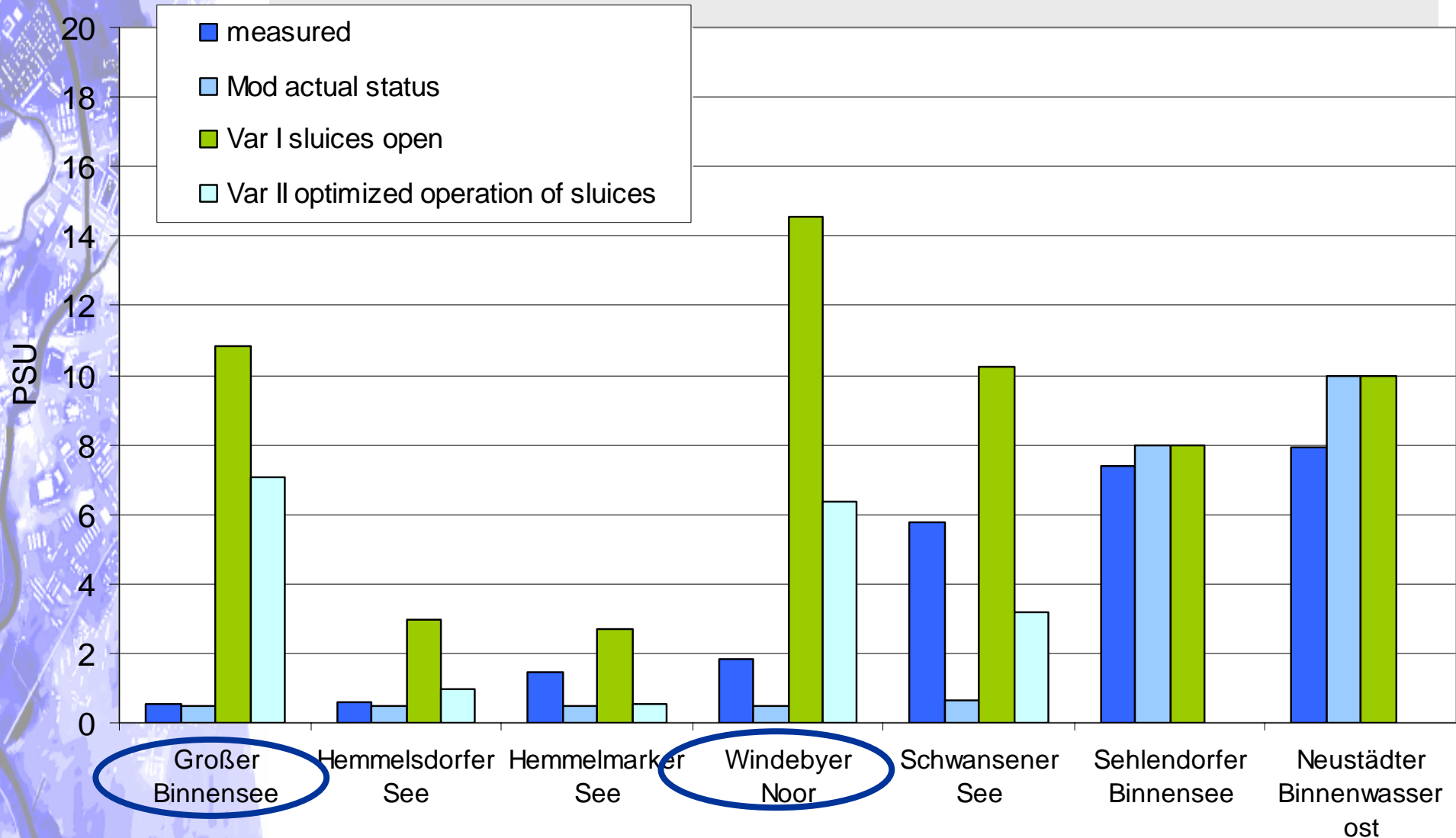


reed plants at Lake Großer Plöner See



## Mean Salinity

Baltic Sea: 18 PSU

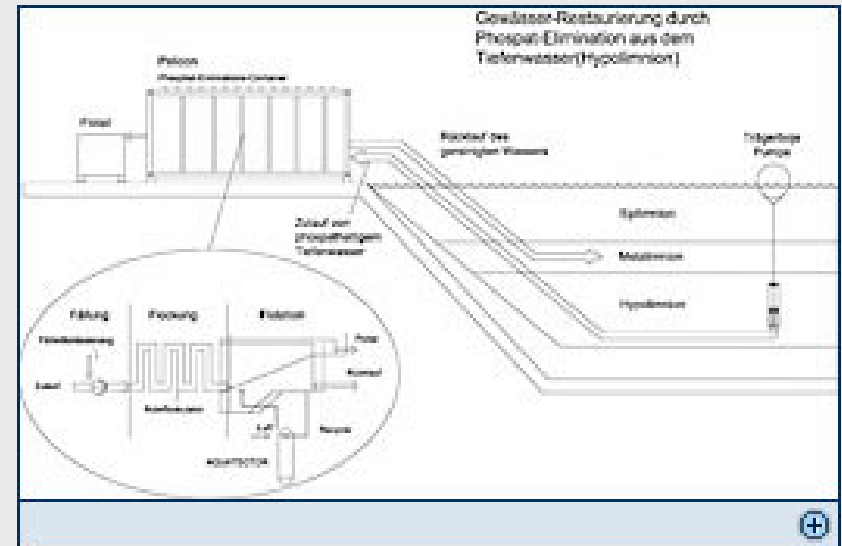




## High nutrient concentrations in the lake as a result of higher input in former times

-> acceleration of recovery

- **treatment or drainage of deep water**
- treatment of sediments
- bio-manipulation  
(promotion of predatory fish)



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

# 4. Role Allocation in the Implementation of WFD

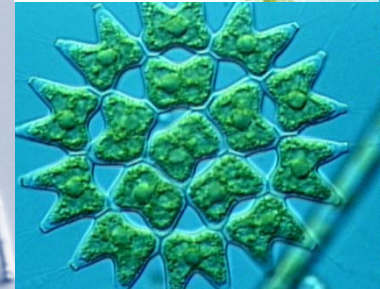
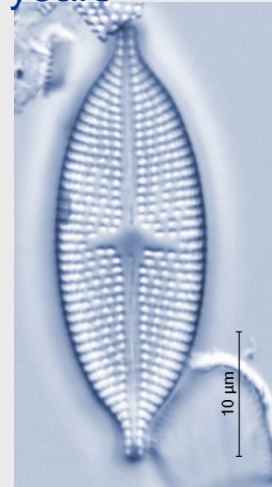
## Characterisation of river basin - LLUR:

### ➤ Monitoring

- Survey: 5 lakes > 10 km<sup>2</sup>, 3 „good“ lakes  
Chemistry, Phytoplankton: every 6 years  
Macrophytes/Phytobenthos: every 3 years  
Macroinvertebrates, fish: every 6 years?
- Operative: 41 „not good“ lakes > 0.5 km<sup>2</sup> (representative regarding type and impact),  
8 smaller lakes NATURA 2000  
Chemistry, Phytoplankton: every 6 years  
Macrophytes/Phytobenthos: every 3 – 6 years

### ➤ Assessment.... 😊 😐 😞

### ➤ Estimation of important impacts





## 4. Role Allocation in the Implementation of WFD



Vorläufige Gebietsaufteilung für die Wasserrahmenrichtlinie

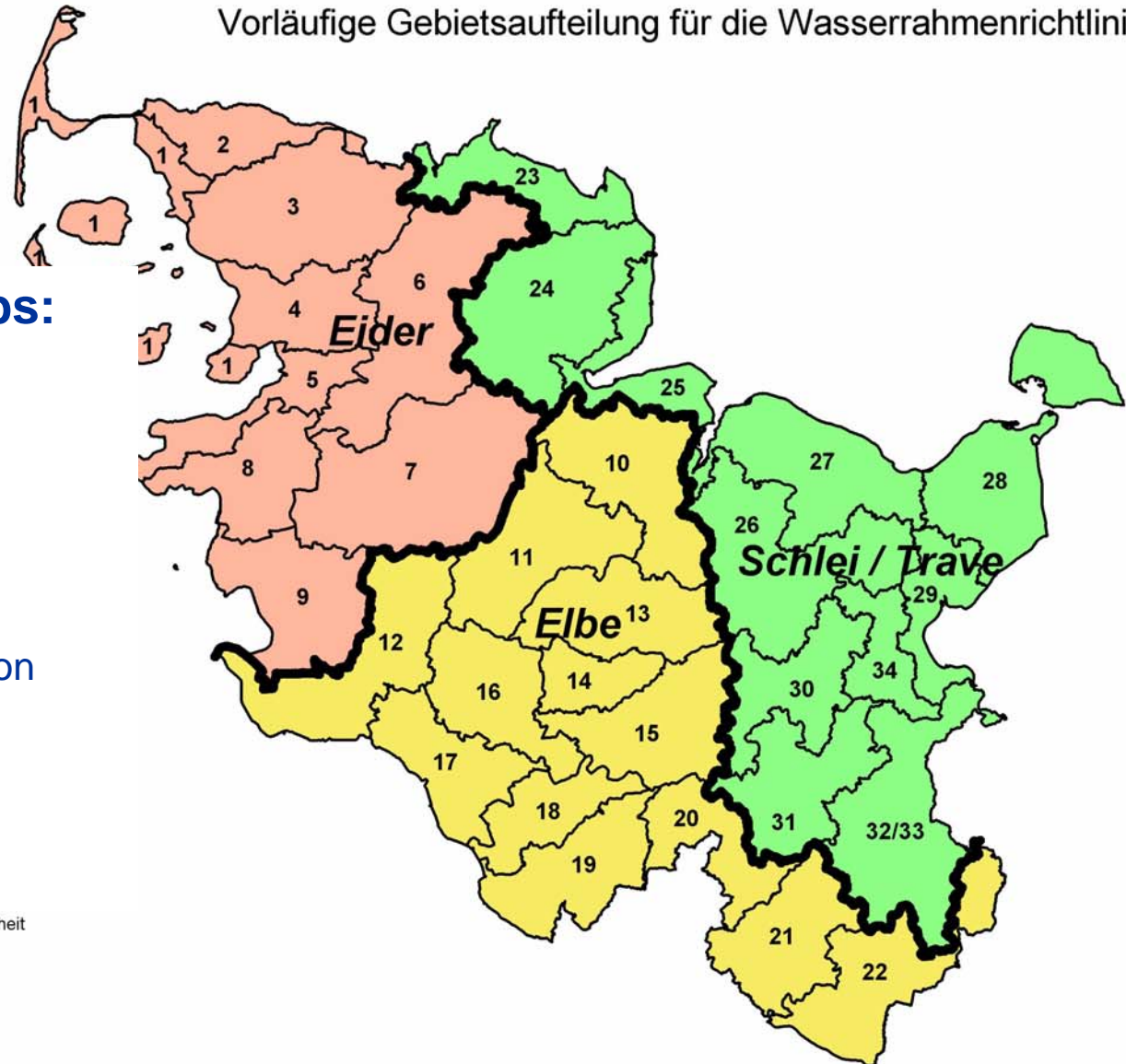
### 30 Working-Groups:

Waterboard (head)

Stakeholders:

- County
- Towns
- Nature conservation
- Farmers
- ...

Ministry



Stand: 07.08.2002

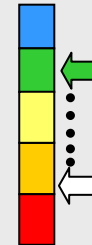
# 4. Role Allocation in the Implementation of WFD



LLUR

## Results:

- Assessment of actual status
- Aims
- Important impacts, needed enhancement of Phosphorus-retention
- When indicated: floor space required (very roughly)
- Other measures



Working Group  
in sub-basins  
„Implementation-area“

**Realization seems possible?**  
**Where?**  
**Possible responsables**

**Yes**

LLUR, LKN

## Programm of measures for each lake

Feasible objectives  
Efficiency of costs  
Priorities

Responsibles  
(waterboard, town, county,  
Nature Foundation)

**Realization**





# 4. Role Allocation - Integrating Interests



## Nature Conservation



### data base of measures for each waterbody

- lakes in NATURA 2000- aereas
  - Agreement on aims
  - Contributions of measures by our colleagues from nature conservation
  - Assessment of risks, caused by WFD-measures




### Problem

- Grazing on lake shores

## 4. Role Allocation - Integrating Interests

### Agriculture



- Round Tables for protection of groundwater – consulting of pilot farms
- agricultural consulting for farmers tilling near lakes
- voluntary contracts with the aim of reduction of nutrients losses to the groundwater
- investigating pathways of nutrient inputs together with waterboards
- purchase land
- compensation for crop deficits
-  Problem: biogas plants, intensive cultivation of corn, land is run short



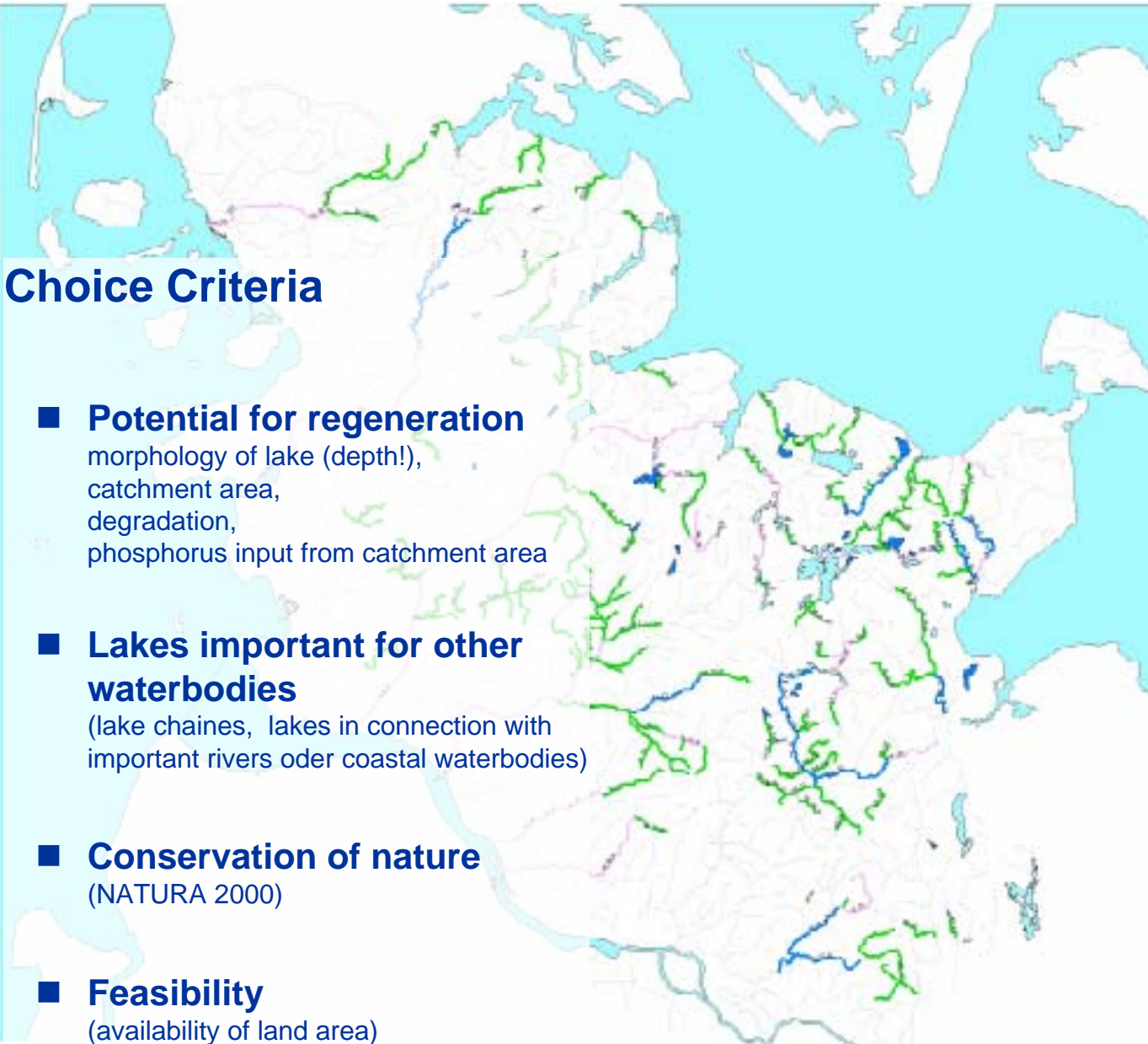
# 5. Key Activities – Lakes with Priority



Karte der Vorranggewässer  
Stand Juni 2009

## Choice Criteria

- **Potential for regeneration**  
morphology of lake (depth!),  
catchment area,  
degradation,  
phosphorus input from catchment area
- **Lakes important for other waterbodies**  
(lake chains, lakes in connection with important rivers oder coastal waterbodies)
- **Conservation of nature**  
(NATURA 2000)
- **Feasibility**  
(availability of land area)

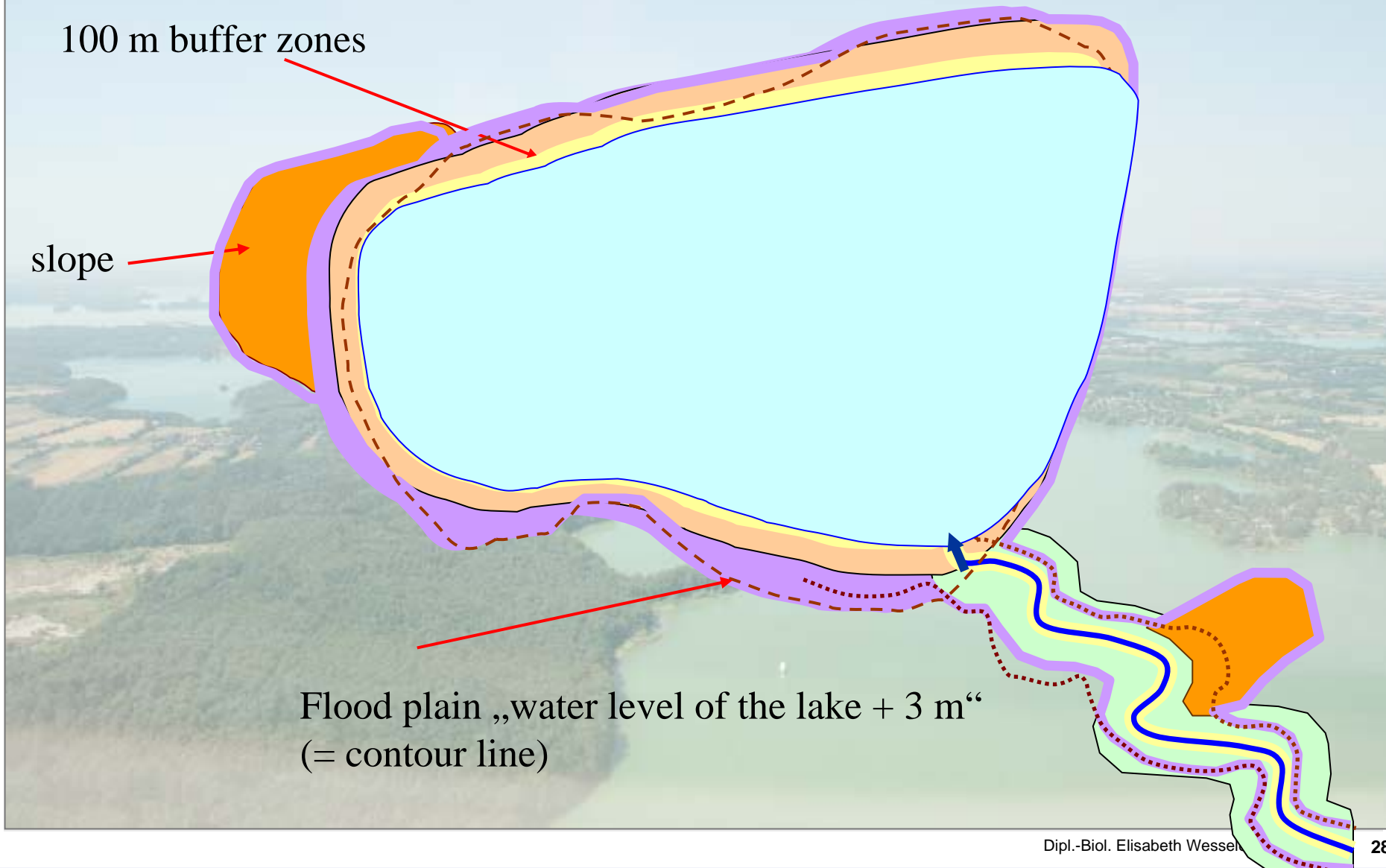


10000 0 10000 20000 Meter

Bearbeitung:  
LLUR Dezemat 41: Fließgewässerökologie

# 5. Key Activities

A map for SH with most important areas for protection of lakes and rivers





# 6. Achieving the Aims?

WFD § 4 environmental objective → good ecological status

Exceptions possible:

(4) Extension of deadlines (2021, 2027) → 85 % of lakes in SH

- ❖ 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](http://www.wasser.sh)**



!?



## **Thank you for your attention !**