One of the biggest threats to lakes: reactive nitrogen

Prof. Dr. Manfred Niekisch
German Advisory Council on the Environment
(Sachverständigenrat für Umweltfragen, SRU)

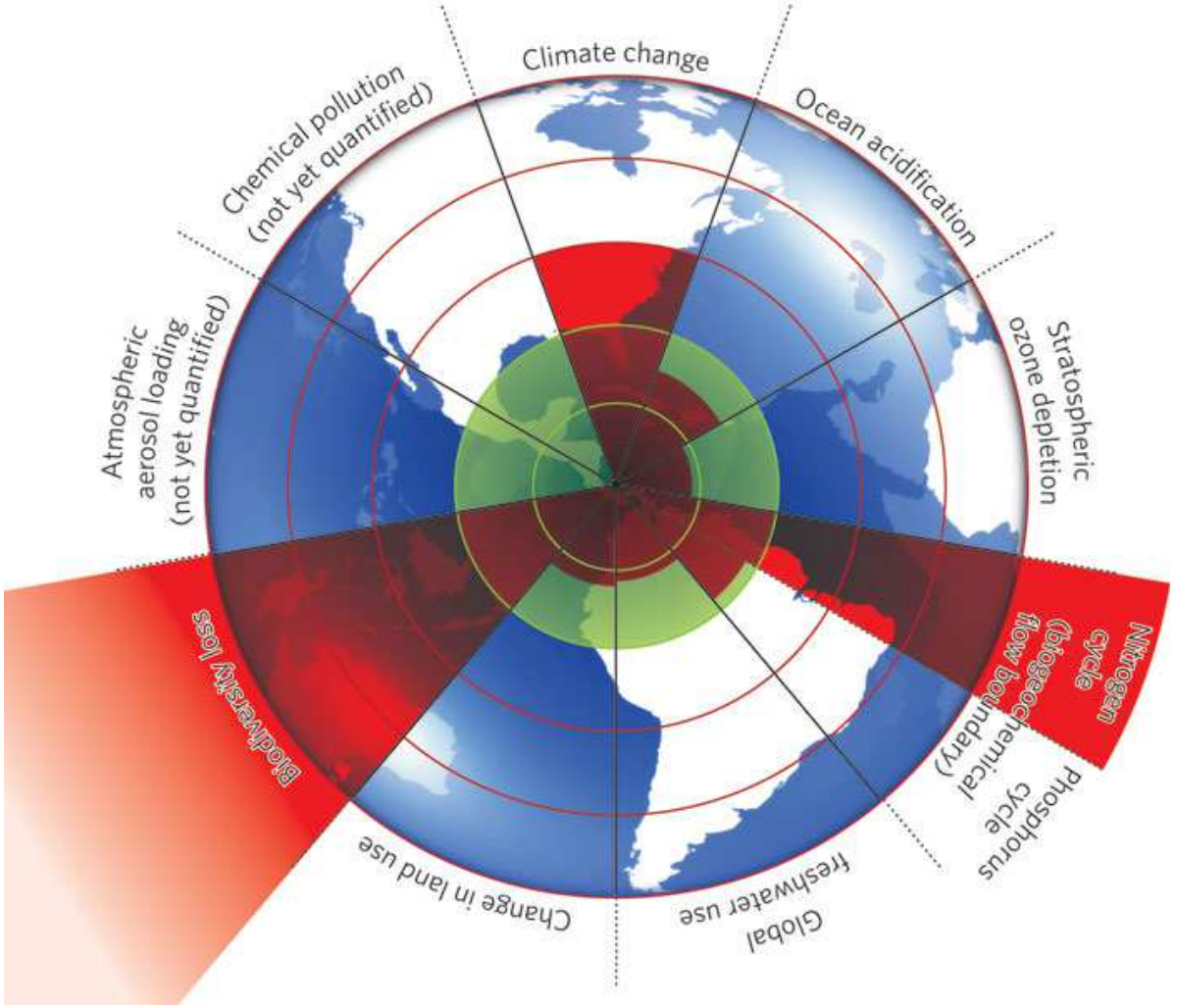
Nanchang, China

German Advisory Council on the Environment

- Interdisciplinary, scientific and independent
- Seven professors from different disciplines nominated by Cabinet
- Judgements on environmental issues
- Early warning function
- Ideas for sustainable transitions
- Inform stakeholders and the broader public

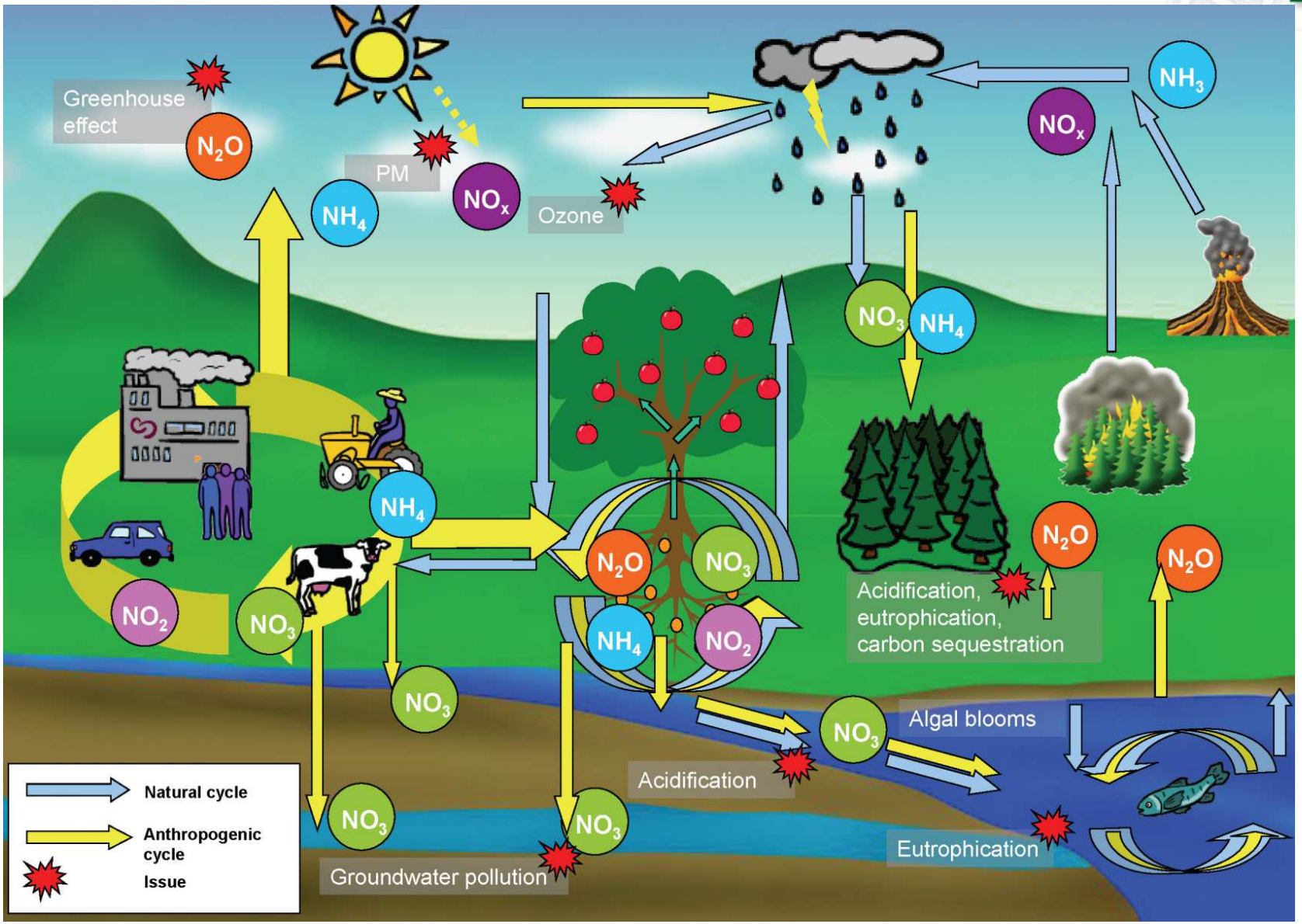
Planetary Boundaries

A safe operating space for humanity



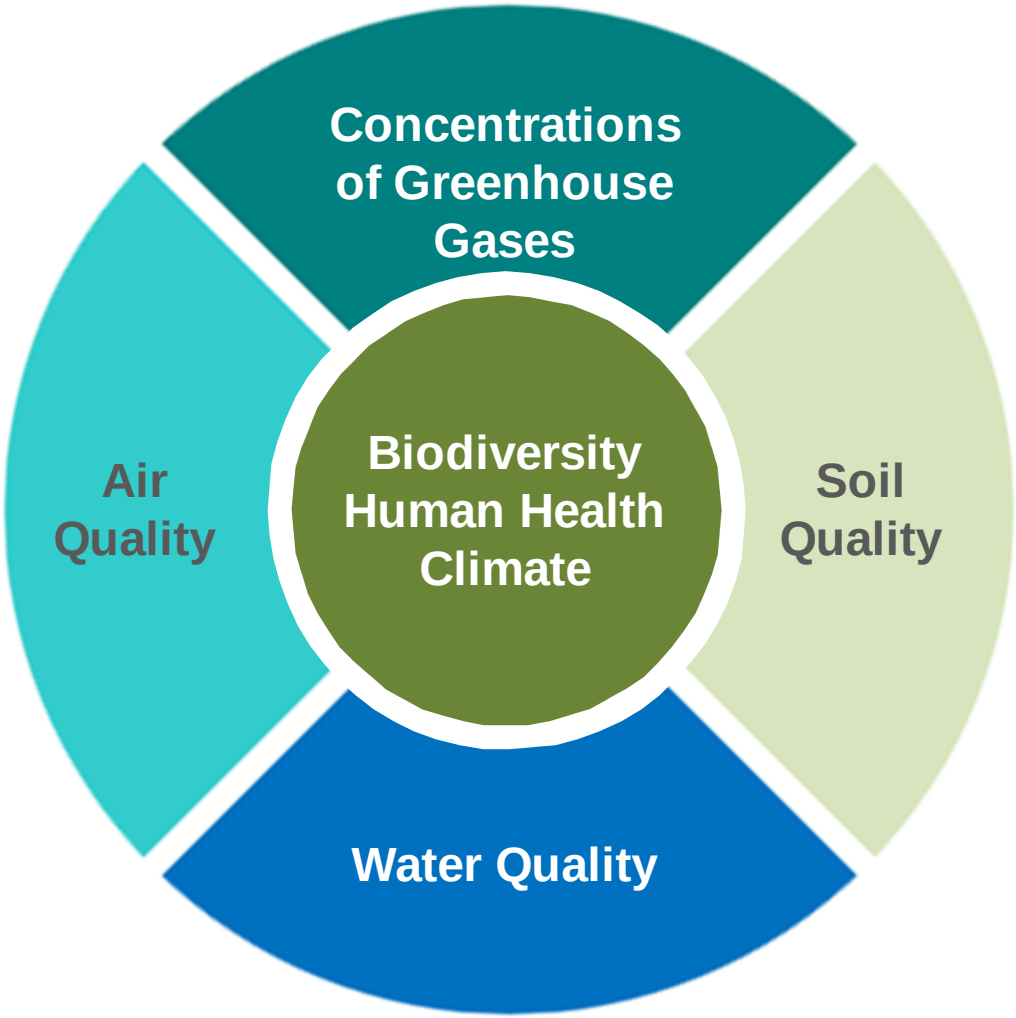
Source:Rockström et al. 2009

The Nitrogen Cycle



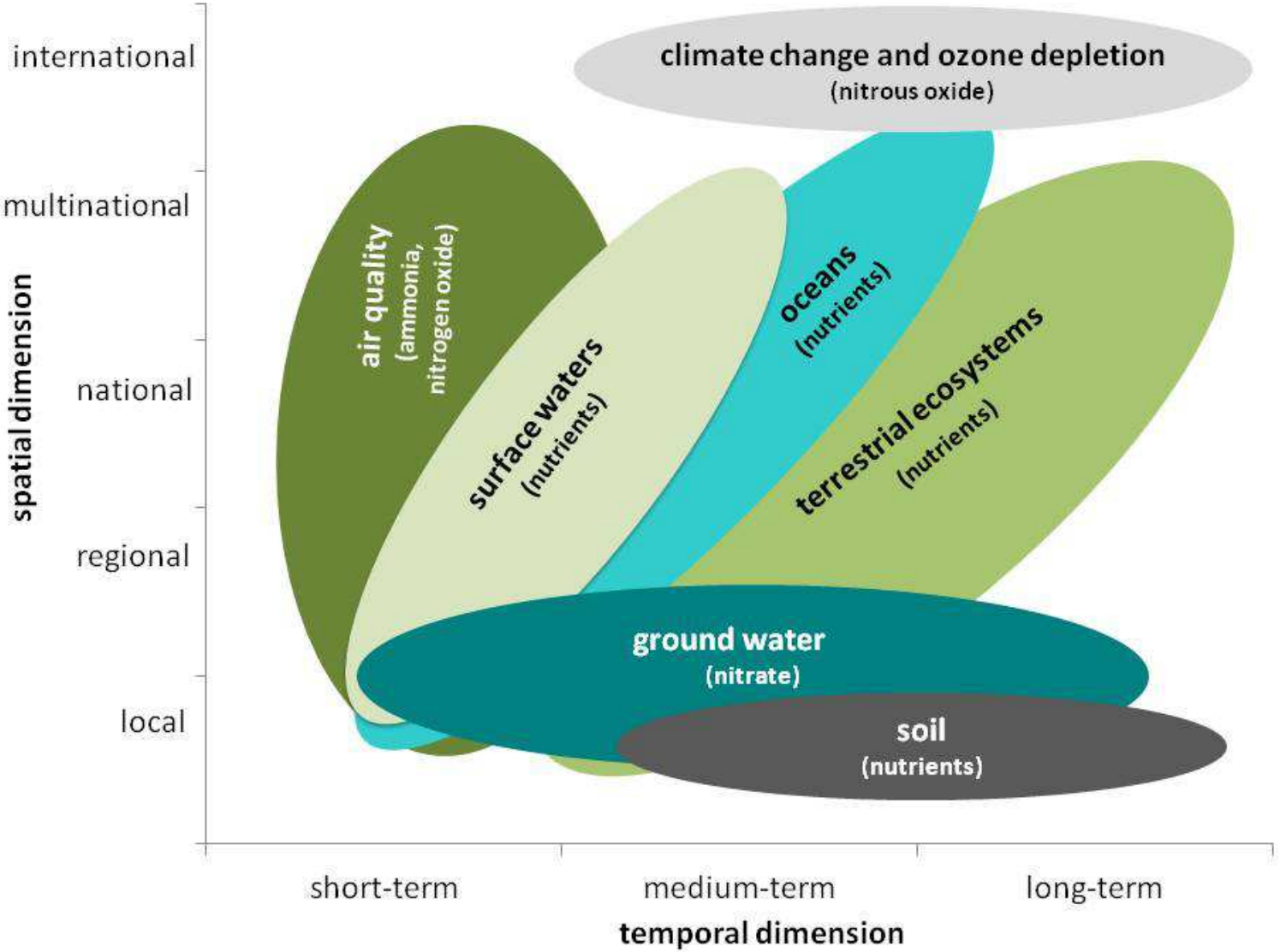
Source: Sutton et al. 2009 (ENA)

Diverse effects of reactive nitrogen pollution



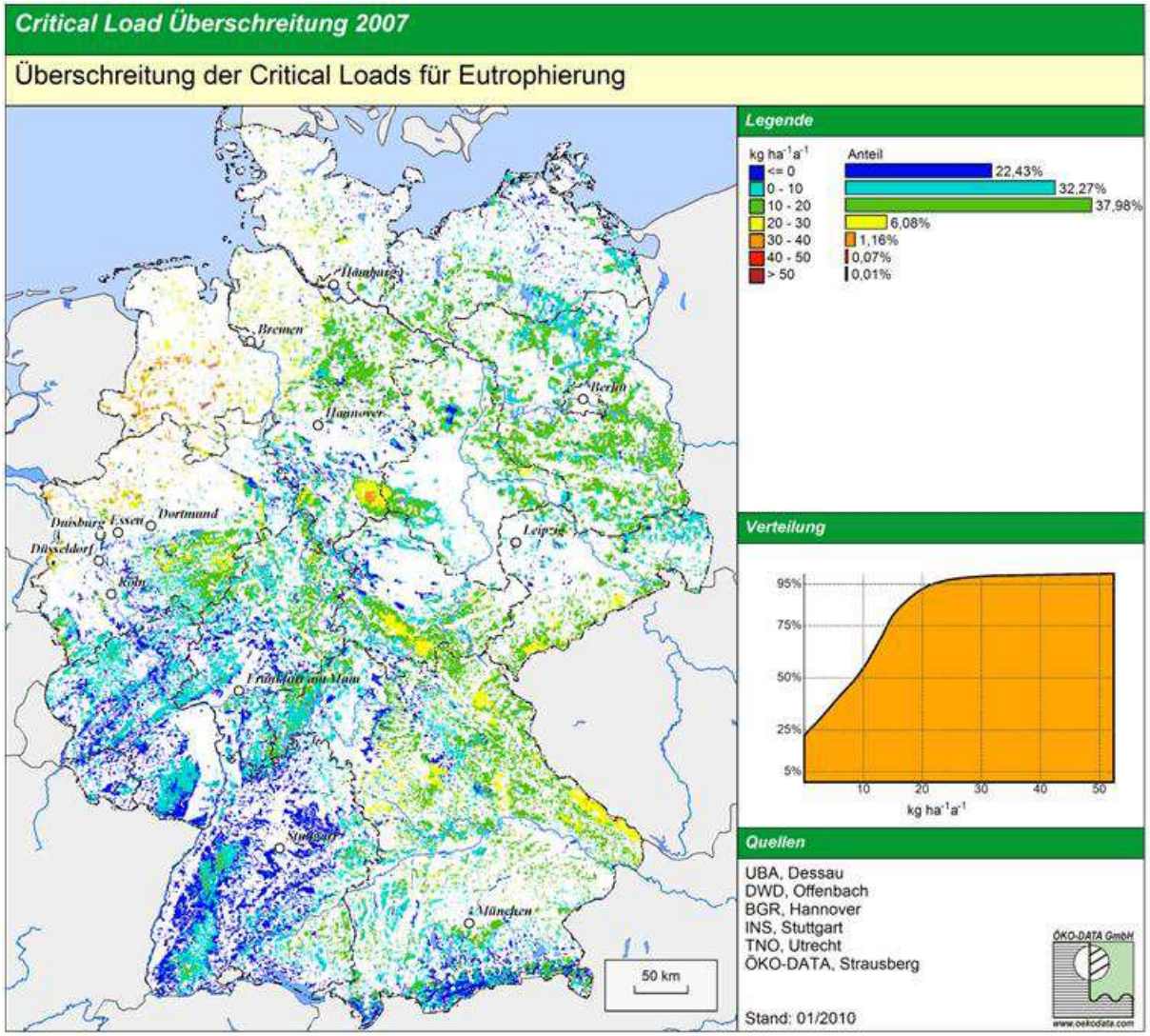
Nitrogen components

An important issue with multiplex dimensions



Reactive nitrogen in terrestrial ecosystems

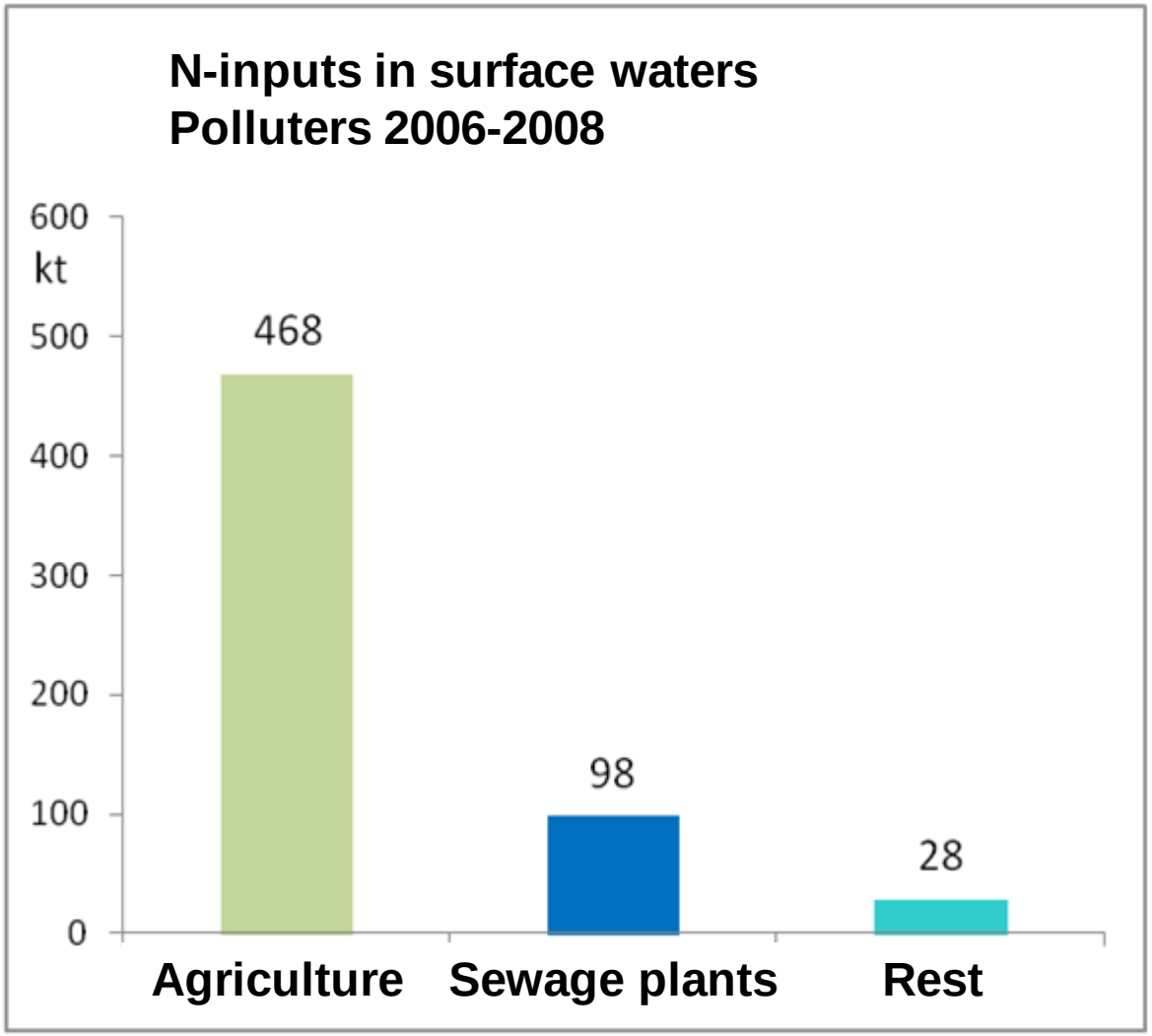
Germany as an example



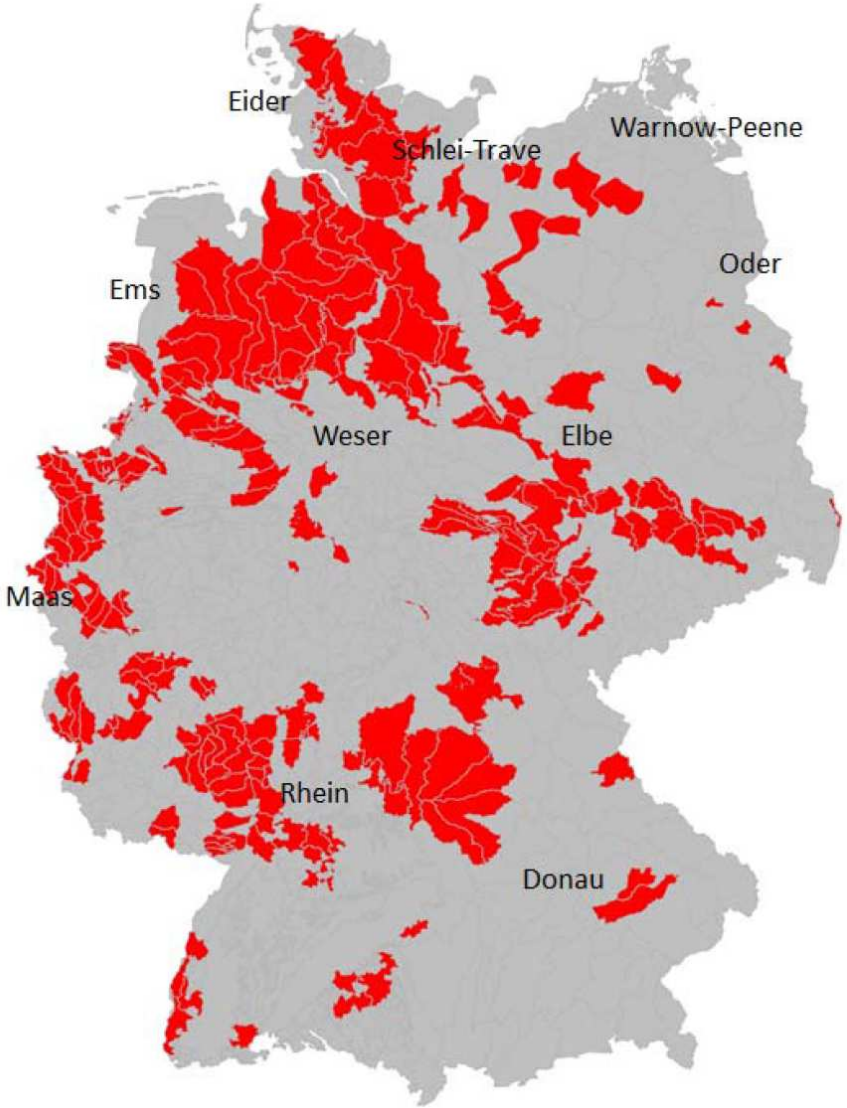
- **6 - 62 kg N ha a^{-1} via depositions**
- **mean: 22 kg N ha a^{-1}**
- **On 78 % of the area Critical Loads for eutrophication are exceeded**

Agricultural pollution: Nitrogen

Surface waters in Germany



Load situation in Germany: ground water



Due to nitrate :

27 % of groundwater bodies in poor chemical status (WFD, >50 mg/l)

Source: Völker 2014 based on WasserBLIcK w.Y.

Pollution situation: waterbodies in Europe

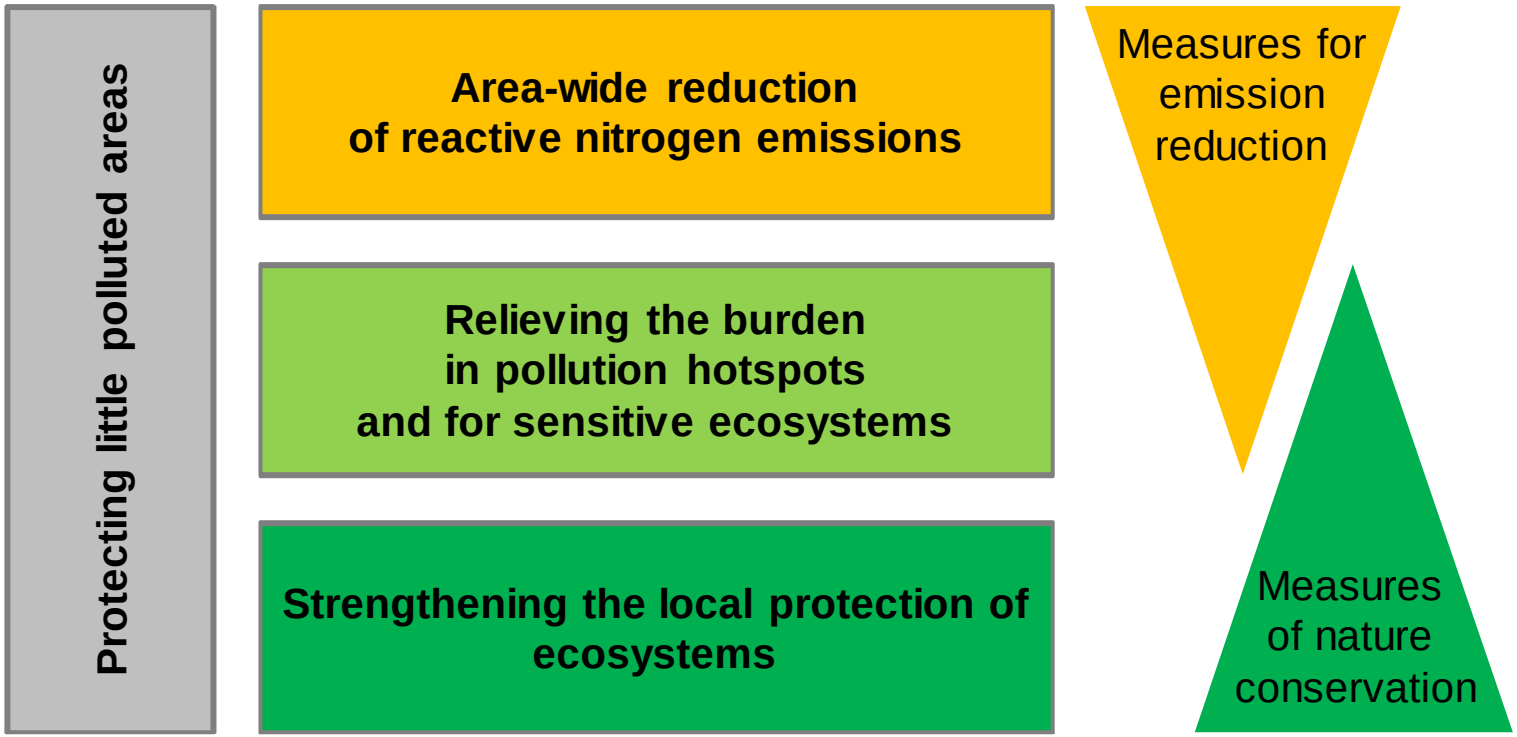
- **Eutrophication of waterbodies (nitrogen, phosphates)**
- **Higher costs for drinking water treatment**
- **Agriculture main source (80 % of N inputs)**
- **Both good chemical and good ecological status in some EU countries not achieved (e.g. Germany)**
  - **Nitrate Directive**
  - **Water Framework Directive**

Nitrogen pollution as a political issue

- **Nitrogen emmions often linked to basis of agricultural land use**
- **Fragmentation of competences**
  (Environment, agriculture, transport, industry)
- **Little coordination and conflicts**
  - **(e.g. Bioenergy Policy vs. Nature Conservation)**
- **Low priority in decision-making process**
- **Little public attention**

Four complementing approaches

How to reduce effects of reactive nitrogen pollution



What to do?

Reduction of reactive nitrogen emissions

- **Reform of EU Agriculture Policy**
- **Amendment of the Fertiliser Application Ordinance (DüV)**
- **Surplus levy**
- **NERC-Directive**
- **Change in food consumption patterns**
- **Bioenergy Policy**

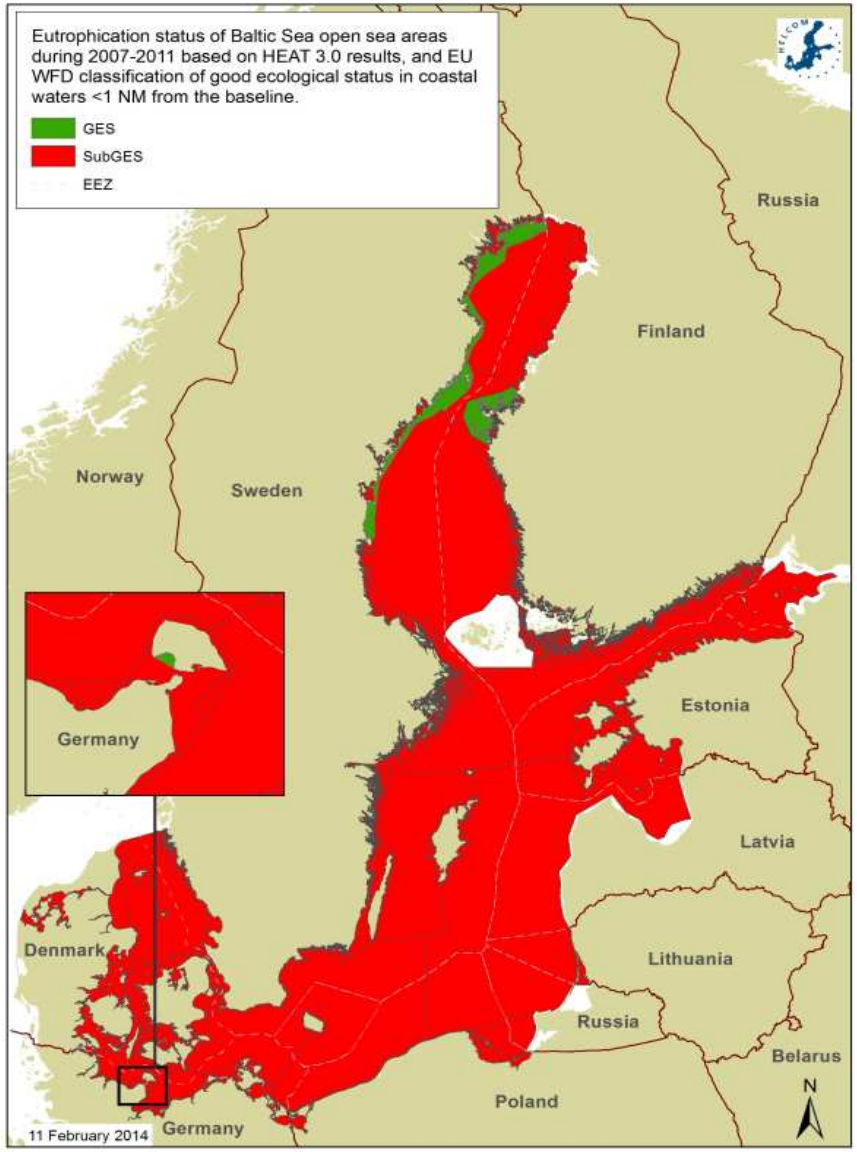
© Dieter Schütz/ pixelio.de

Water bodies: sensitive aquatic ecosystems and pollution hotspots

Additional measures: Reduction of reactive nitrogen inputs

- **<u>Strengthening the local protection of ecosystems using nature conservation measures</u>**
- **Buffer zones, where land management must meet a range of obligations**
- **Contract nature conservation**
- **Agri-environmental measures**

Eutrophication status of Baltic Sea 2007-2011

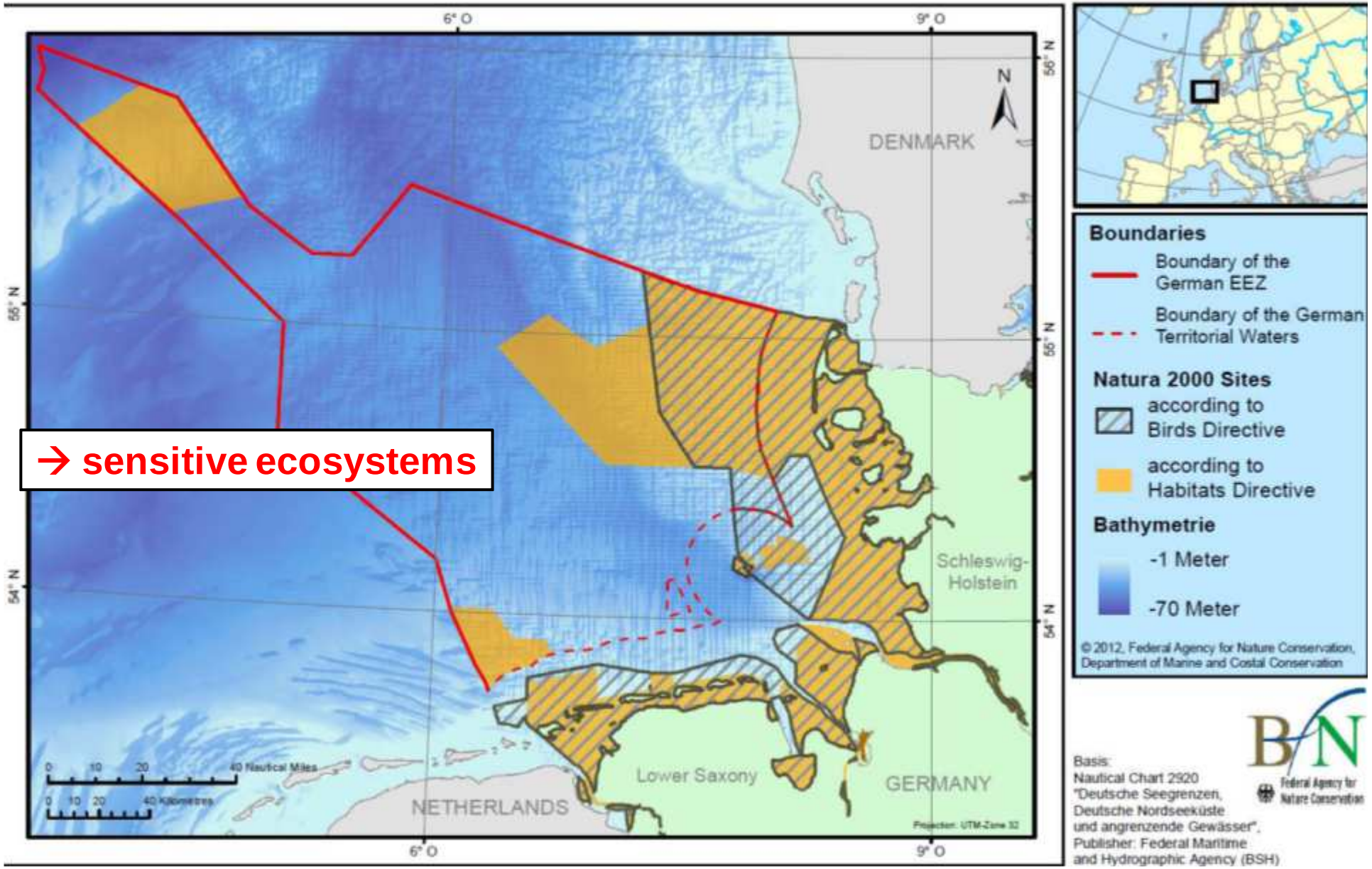


Green = good status
Red = bad status

HELCOM 2014

Marine Protected Areas (MPAs)

Important instrument for the protection of marine biodiversity



National Strategy for Nitrogen

- **Better horizontal integration**
  (Environment, agriculture, transport, industry)
- **Better vertical integration (EU, national, federal states)**
- **Systematic approach**
- **Public attention**
- **Raising awareness**

Foto: Annette Birkenfeld, nova-Institut


Thank you for your
attention!
www.umweltrat.de