

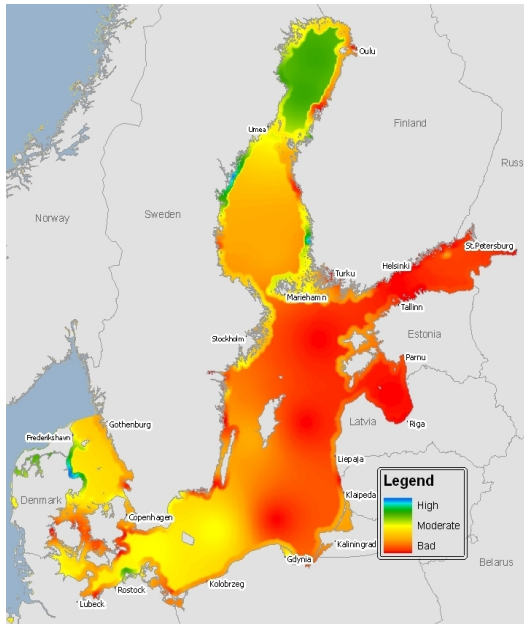
Good agricultural practice – fertilizer application in Germany in the scope of HELCOM recommendations

Dr. Dietrich Schulz

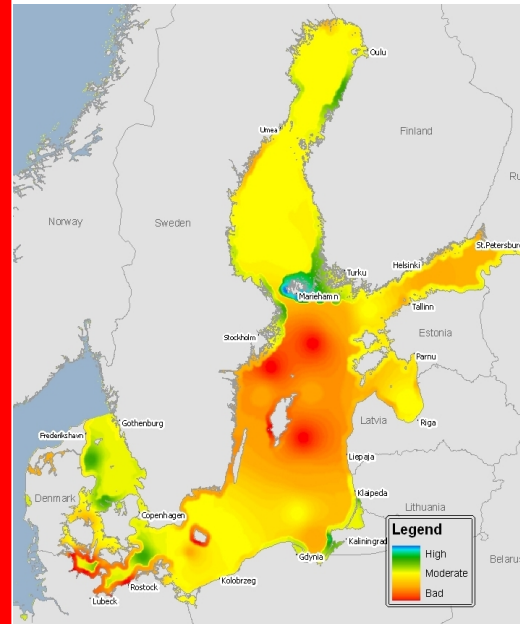
Federal Environment Agency, D-06844 Dessau-Roßlau, Germany

What is the status? – Eutrophication, hazardous substances and biodiversity

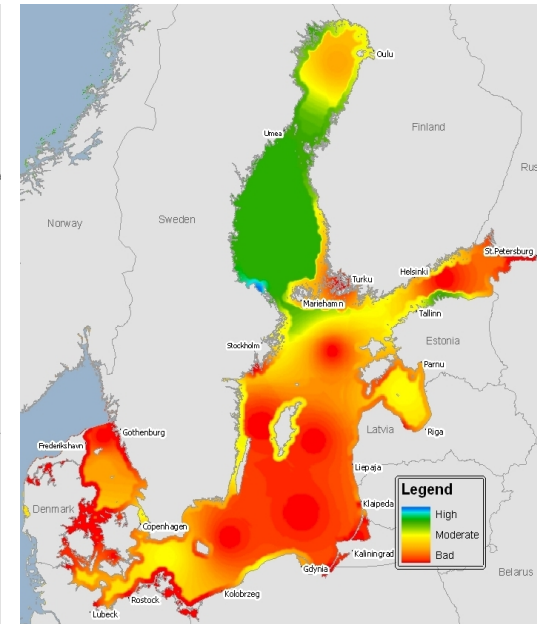
Eutrophication - HEAT



Hazardous substances - CHASE

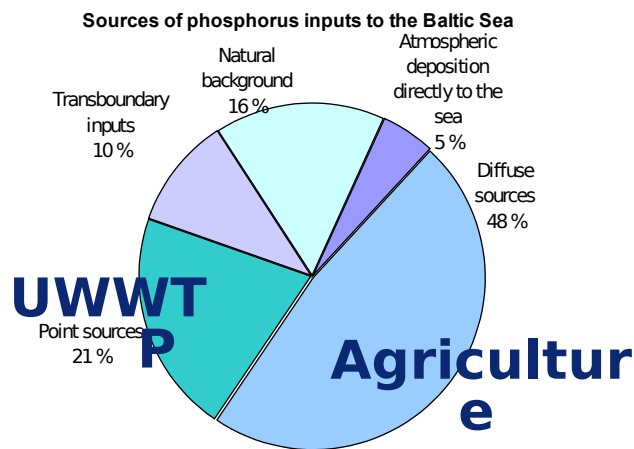
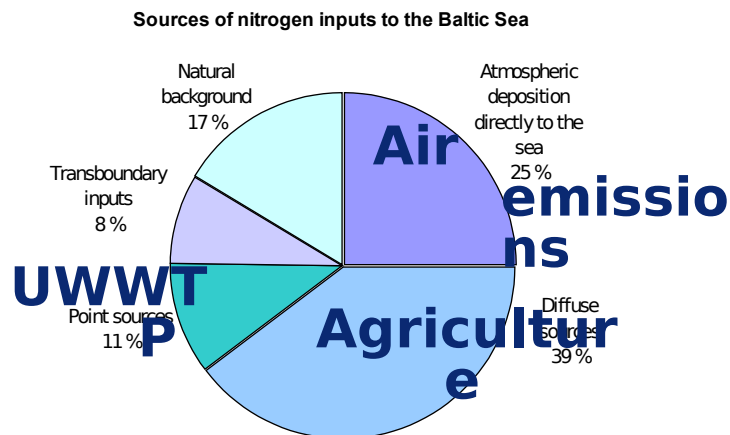
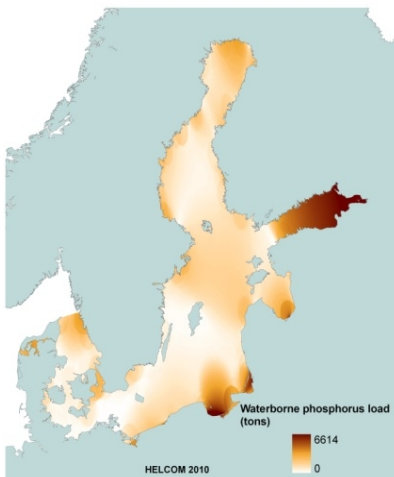
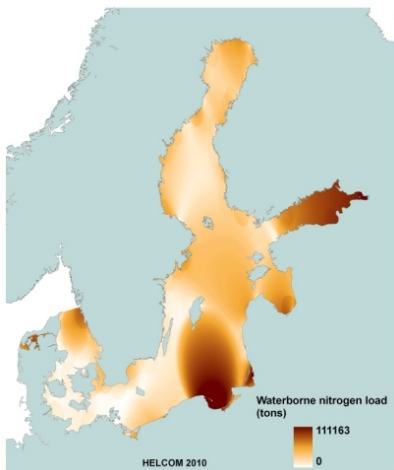


Biodiversity - BEAT



Thematic assessments have been produced using HEAT, CHASE and BEAT tools and they are each complemented with a confidence assessment.

Eutrophication: Inputs of nutrients



The Baltic Sea Action Plan (BSAP) 2007 (I)

BSAP-Objectives for nutrients and eutrophication (= good ecological status)

- Nutrient concentrations close to natural background.
- Clear water.
- Natural extent of algae blossoms.
- Natural occurrence and distribution of plants and animals.
- Natural oxygen concentration in water.

The Baltic Sea Action Plan 2007 (II): Nutrient inputs: tolerable and actual amounts (regionalized according to the MARE NEST model)

Sub-region	Maximum allowable nutrient input (tonnes/a)		Inputs in 1997-2003 (normalised by hydrological factors)		Needed reductions	
	Phosphorus	Nitrogen	Phosphorus	Nitrogen	Phosphorus	Nitrogen
Bothnian Bay	2,580	51,440	2,580	51,440	0	0
Bothnian Sea	2,460	56,790	2,460	56,790	0	0
Gulf of Finland	4,860	106,680	6,860	112,680	2,000	6,000
Baltic Proper	6,750	233,250	19,250	327,260	12,500	94,000
Gulf of Riga	1,430	78,400	2,180	78,400	750	0
Danish straits	1,410	30,890	1,410	45,890	0	15,000
Kattegat	1,570	44,260	1,570	64,260	0	20,000
Total	21,060	601,720	36,310	736,720	15,250	135,000

The Baltic Sea Action Plan 2007 (III):

Annual reduction requirements for N and P.

	Phosphorus (tonnes)	Nitrogen (tonnes)
Denmark	16	17,210
Estonia	220	900
Finland	150	1,200
Germany	240	5,620
Latvia	300	2,560
Lithuania	880	11,750
Poland	8,760	62,400
Russia	2,500	6,970
Sweden	290	20,780
Transboundary Common pool	1,660	3,780

Good Agricultural Practice: The legal basis.

- **EU legislation:**
 - Nitrates Directive (vulnerable zones, good agricultural practice. 170 kg N/ha from manure for arable land).
 - Water Framework Directive (WFD; good condition; management plans).
- **National (German) legislation:**
 - Fertilizer Act
 - **Ordinance on Fertilizer Quality** (Düngemittelverordnung)
 - **Ordinance on Fertilizer Application** (Düngeverordnung. Latest amendment 2007).

The main problem: livestock manure. Not waste, but a valuable fertilizer!

- Apply according to site, climate and yield.
- Save as much mineral fertilizer as possible.
- Minimize environmental losses.
- Save energy and greenhouse gases.
- Use for biogas production and take fermentation leftovers as fertilizers.

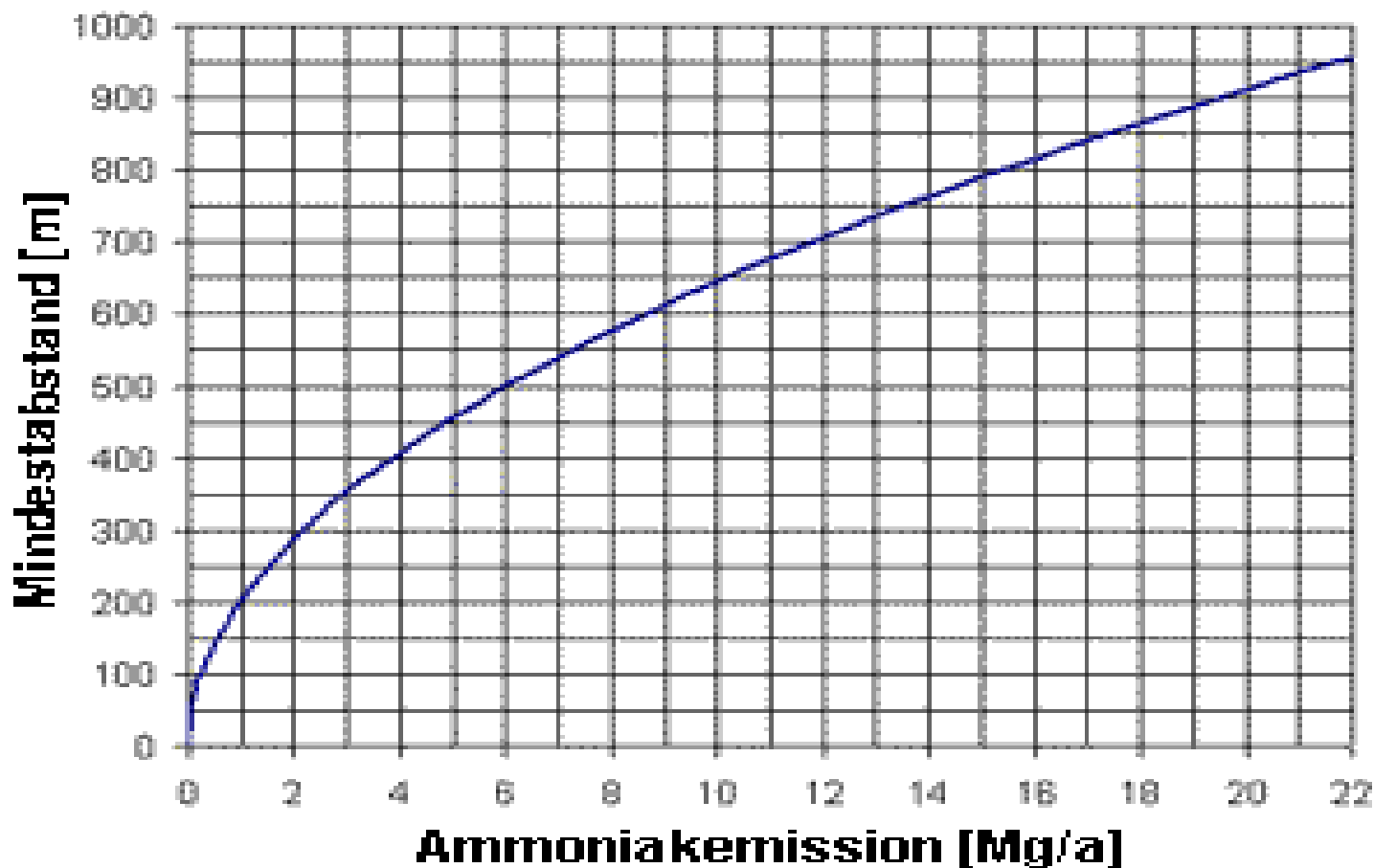
Animal density

- No direct correlation legally fixed.
- Indirectly by limit values for nutrients/ha (book-keeping by manure importing farms) .
- In preparation: Farms with excess manure (exporting farms) in the future must (also) keep records about their manure exports (where, when, how much. Verbringungsverordnung).

Location and design of farm animal houses

- Minimum distance to neighbours according to construction law.
- IPPC-farms (pigs and poultry): permit according to clean air act.
 - Minimum distances to sensitive ecosystems like forests (Ammonia; AUSTAL 2000). Smaller distances possible with air purification device.
 - No (not yet) regulations on odour and particulate matter.
 - Farms >10 000 kg NH₃ p. a. registered in the prtr (www.prtr.bund.de).
- No clean air regulations yet for ~ 1 Mio. horses in Germany!
- Cattle: Simplified authorization process >600 places.
- Best available technology see BREF „Intensive rearing of poultry and pigs.“
 - English: <http://eippcb.jrc.ec.europa.eu/reference/irpp.html>.
 - German: www.bvt.umweltbundesamt.de/sevilla/kurzue.htm.

Minimum distance between animal farms and vulnerable ecosystems (forests, swamps etc.).



Construction of manure storage tanks

- Storage capacity for 6 months.
- Solid or sufficient floating cover (10 cm).
- Keep chicken manure dry.
- Water tightness according to technical guidance documents DIN 1045 and DIN 11622.
- Agricultural waste water and silage effluents to be collected in the manure tanks.
- Federal regulation for manure and silage tanks in preparation.
- Protection against mechanical impacts.

Application of organic manure

- No spreading
 - 1st November – 31st January on arable land.
 - 15th November-31st January on grassland.
- Low emission spreading (negative list of obsolete apparatus) according to generally accepted rules of technique.
- Immediate incorporation into the soil „as soon as possible“ (same day or next morning).
- No spreading when the soil is frozen, snow covered or water saturated).

Application rates for nutrients I

- Limit 170 kg N/ha with manure. Exceptions for grassland up to 230 kg N/ha.
- In autumn 80 kg N_t/ha or 40 kg NH₄-N/ha with manure.
- Estimate or calculate fertilizer need using approved methods.
- Soil analysis for P and K every 6 years.

Application rates for nutrients II

- Book-keeping on nutrients and balance calculations compulsory.
- Tolerable surpluses for N (3 years average; surface balance) decreasing from 90 kg N/ha to 60 kg N/ha (2009-2011).
- Tolerable surplus for P_2O_5 (6 years average) 20 kg/ha.

Winter crop cover

- Fertilizer application in autumn only to winter crops or straw incorporation.
- Cross compliance: 40% of farmland must be covered with plants or plant residues.

Water protection measures and nutrient reduction areas

- Whole Germany is a vulnerable zone.
- 3 m buffer zones along surface waters. No fertilization (exact apparatus 1 m).
- On slopes (>10%) incorporation into soil, 10m buffer zone.
- Extensification and Eco-farming under „second pillar“-programmes (EAFRD) run by the federal states.
- Voluntary cooperation between farmers and water suppliers (Ex.: Munich, Leipzig, Gelsenwasser etc.).

Ammonia emissions

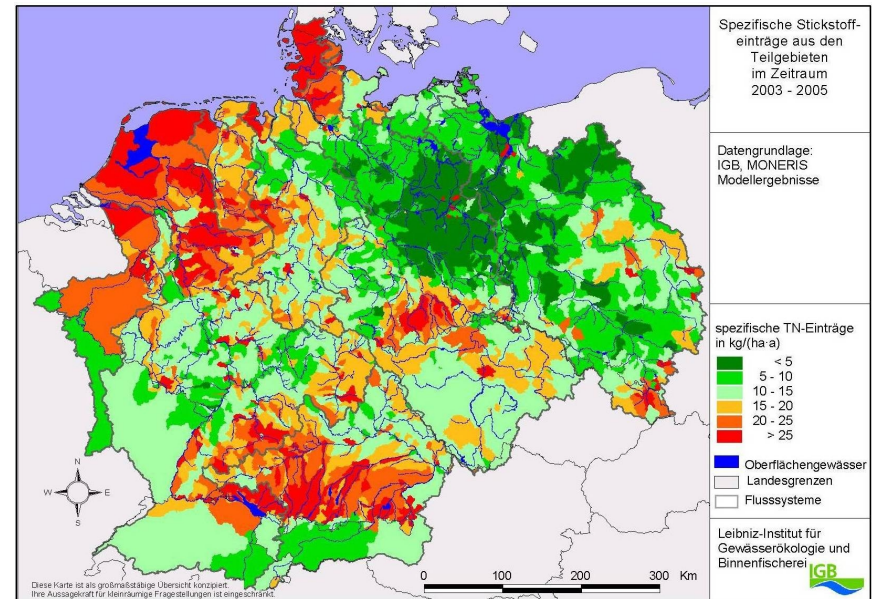
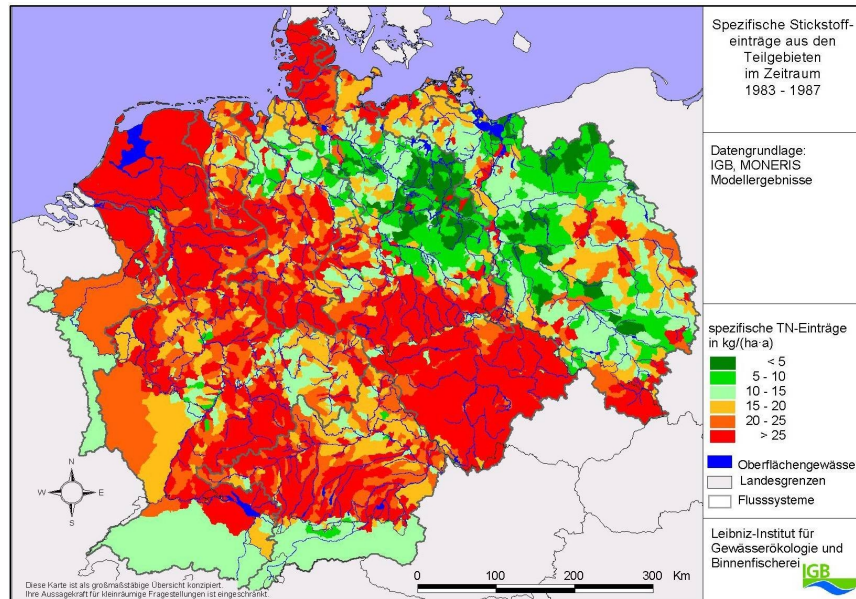
- Minimize losses in stable and tank.
- Spreading with low emission technique.
- Incorporation into soil.
- Air purification on large animal farms.

Germany will not meet the NEC directive targets (550 kt p. a.) and has to apply additional measures.

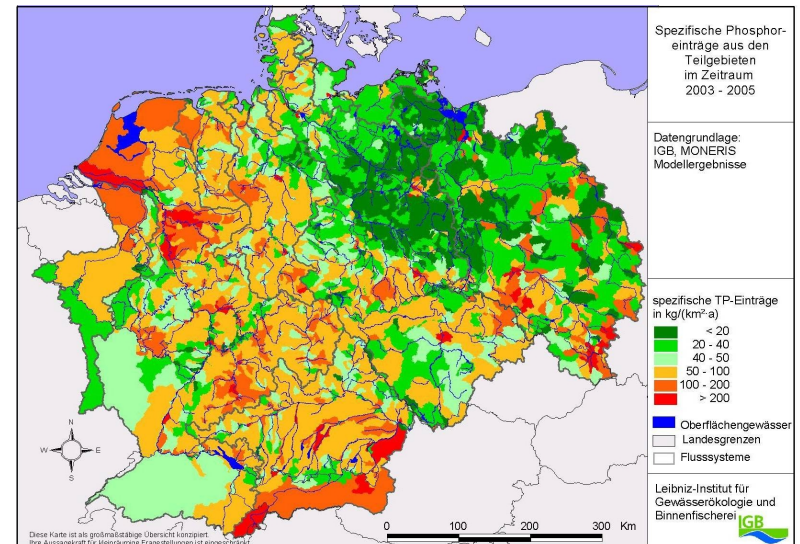
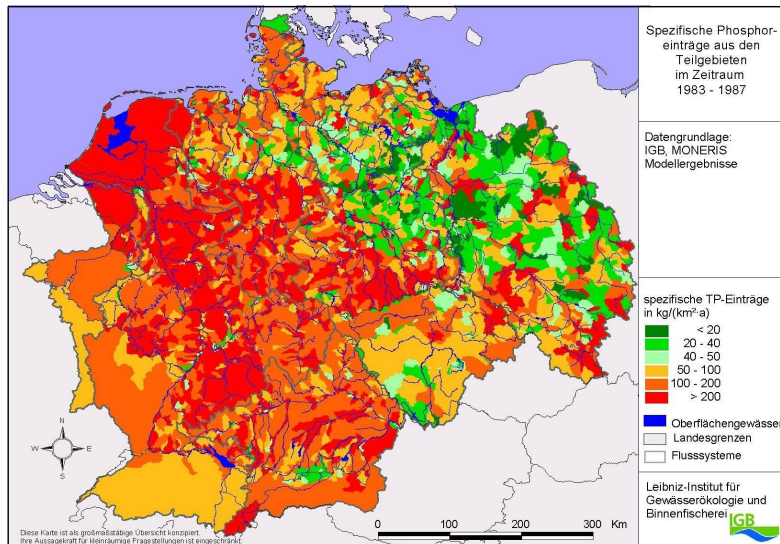
Environmental permits

- Poultry and pigs according to IPPC-Guideline (40 000 poultry, 2000 pigs, 750 sows including piglets).
- Cattle: Simplified permit >600 places.
- No permits for sheep, horses etc.

Nitrogen inputs into surface waterbodies 1985 and 2005



Phosphorus inputs into surface waterbodies 1985 and 2005



Thank you for your attention!!

**Dr. Dietrich Schulz
dietrich.schulz@uba.de**

www.umweltbundesamt.de