

The role of European water legislation – current situation and future challenges

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The European Environment Agency is the EU body dedicated to providing sound, independent information on the environment

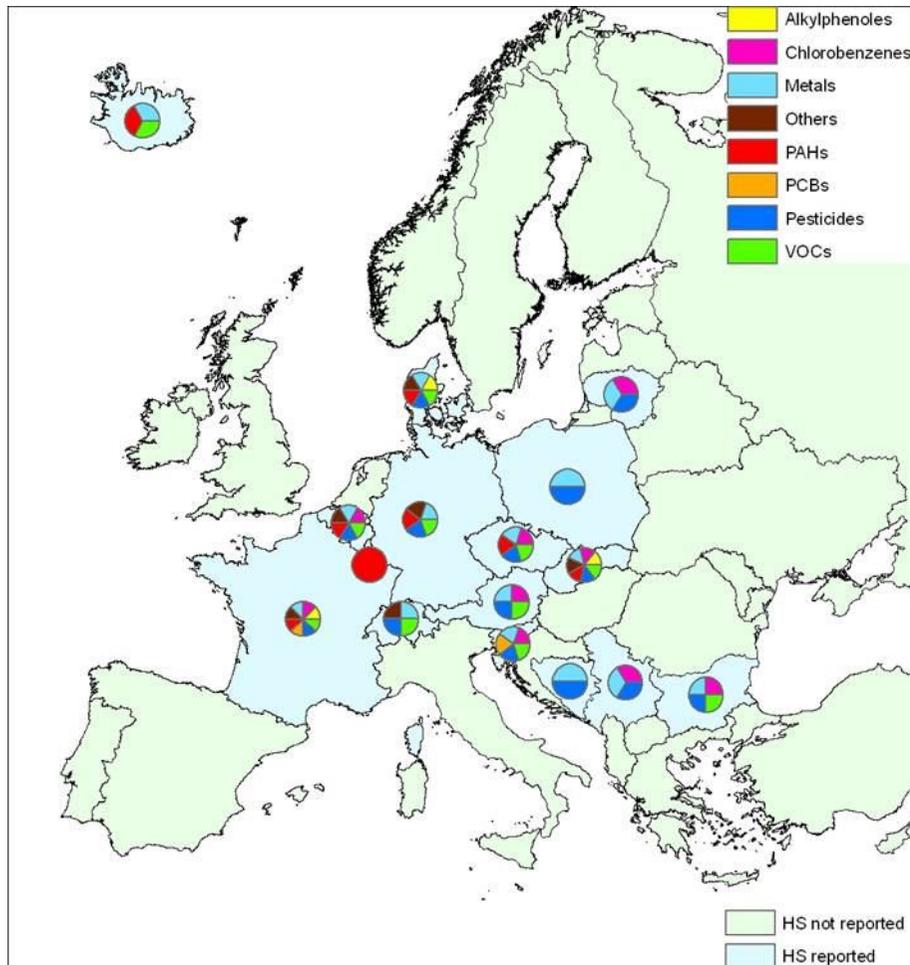


European (EU-27) Water Legislation

- A range of water related legislation exists in Europe
- The Water Framework Directive (WFD) is key, including the 'daughter' EQS Directive addressing chemicals in surface waters
- Related legislation is also important; Nitrates, Drinking Water, Groundwater, Bathing Water, and Urban Wastewater Treatment Directives
- **All have a role (either directly or indirectly) in reducing risks to human health from water pollution**
- Despite this legislation, challenges remain



Groundwater Pollution

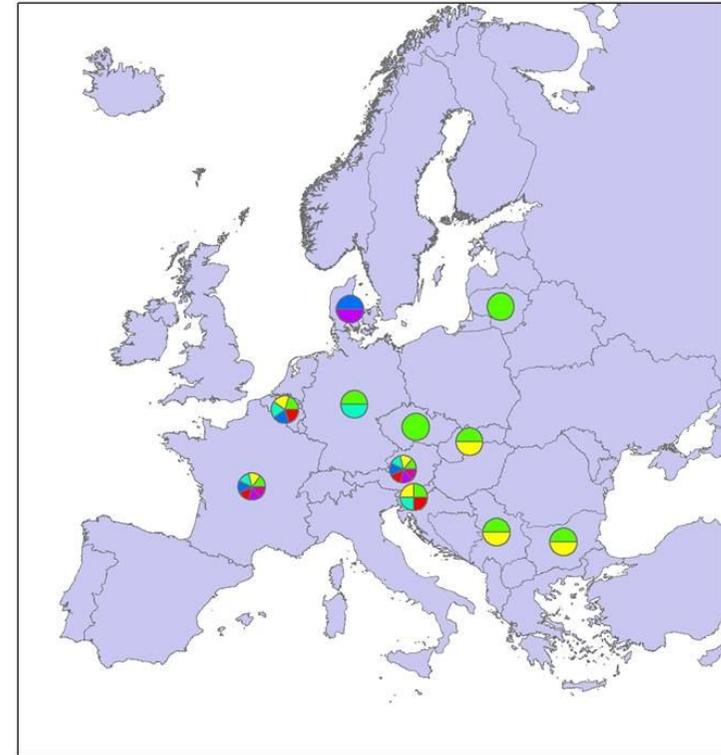


- Range of substances found in groundwaters across Europe
- **Potential contamination of drinking water sources**
- Potential to contaminate surface waters

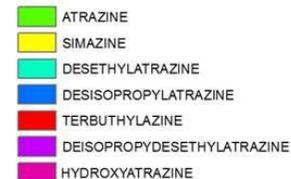


Groundwater Pollution

- Figure; triazine pesticides found in groundwater, between 2003 and 2007, at concentrations above 0.1 µg/L (the DWD threshold)
- Evident despite banning
- Metabolites evident
- Lack of good data



Pesticides triazine



Related Legislation

- Groundwater Directive – sets concentration limits (50mg/l for nitrate, 0.1µg/l for pesticides) and requires measures to prevent/limit inputs of pollutants to GW – direct link to article 17 of WFD
- Nitrates Directive – requires action plans in nitrate vulnerable zones, limit of 50mg/L nitrate
- WFD highlights the value of drinking water protected areas
- Drinking Water Directive – focused on quality standards at the tap



Chemicals in Surface Water

- Protection primarily through the EQS Directive setting concentration thresholds for (so far) 33 priority substances (PS)
- PS's include pesticides, herbicides, metals, PAH's, flame retardants, solvents, plasticisers etc.
- Some PS are defined as priority *hazardous* substances due to their toxicity, persistence and bioaccumulation
- EQS's apply to rivers, lakes and coastal waters



Floods

- Since 1998 floods in Europe have caused some 700 deaths, the displacement of about half a million people and at least €25 billion in insured economic losses.
- Floods Directive, established in 2007, one aim is to reduce risks to public health
- Requirement to identify flood risk and establish management plans



Storm Overflows

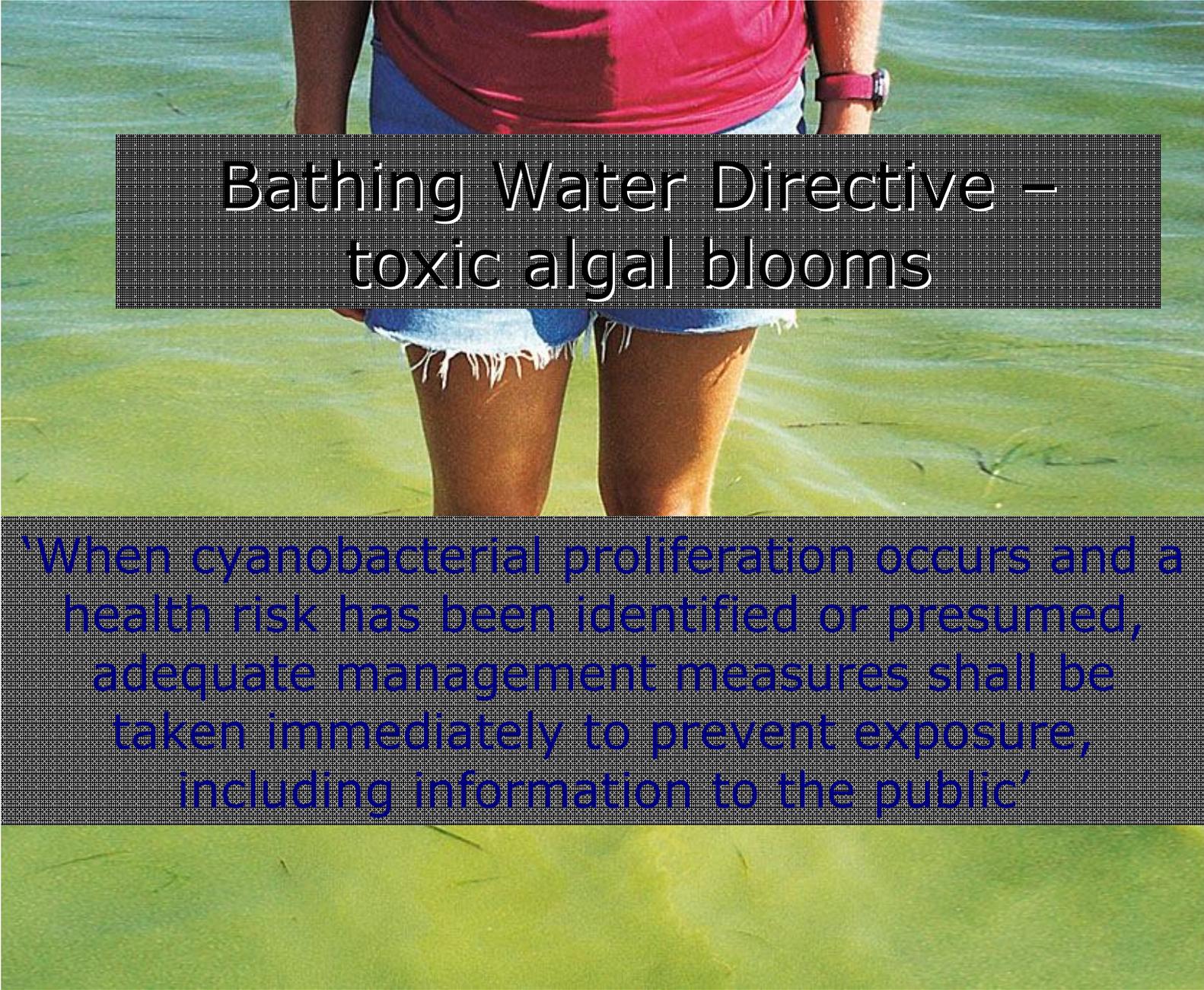
- Sewer discharges combined with urban runoff
- Untreated sewage discharged – basements, streets, parks, surface waters
- Risk from bacteria, viruses, dangerous chemicals



Bathing Water Quality

- Bathing Water Directive to safeguard public health and protect aquatic environment from pollution
- Classification of bathing water quality based on percentile concentrations for intestinal enterococci and escherichia coli
- Separate set of standards for inland and coastal bathing water sites



A photograph of a person from the waist down, wearing a red t-shirt and light blue denim shorts, standing in shallow, greenish water. The water has a distinct green tint, indicating a cyanobacterial bloom. The person is wearing a pink watch on their left wrist. The background shows the water extending to the horizon.

Bathing Water Directive – toxic algal blooms

'When cyanobacterial proliferation occurs and a health risk has been identified or presumed, adequate management measures shall be taken immediately to prevent exposure, including information to the public'

Bathing Water Quality

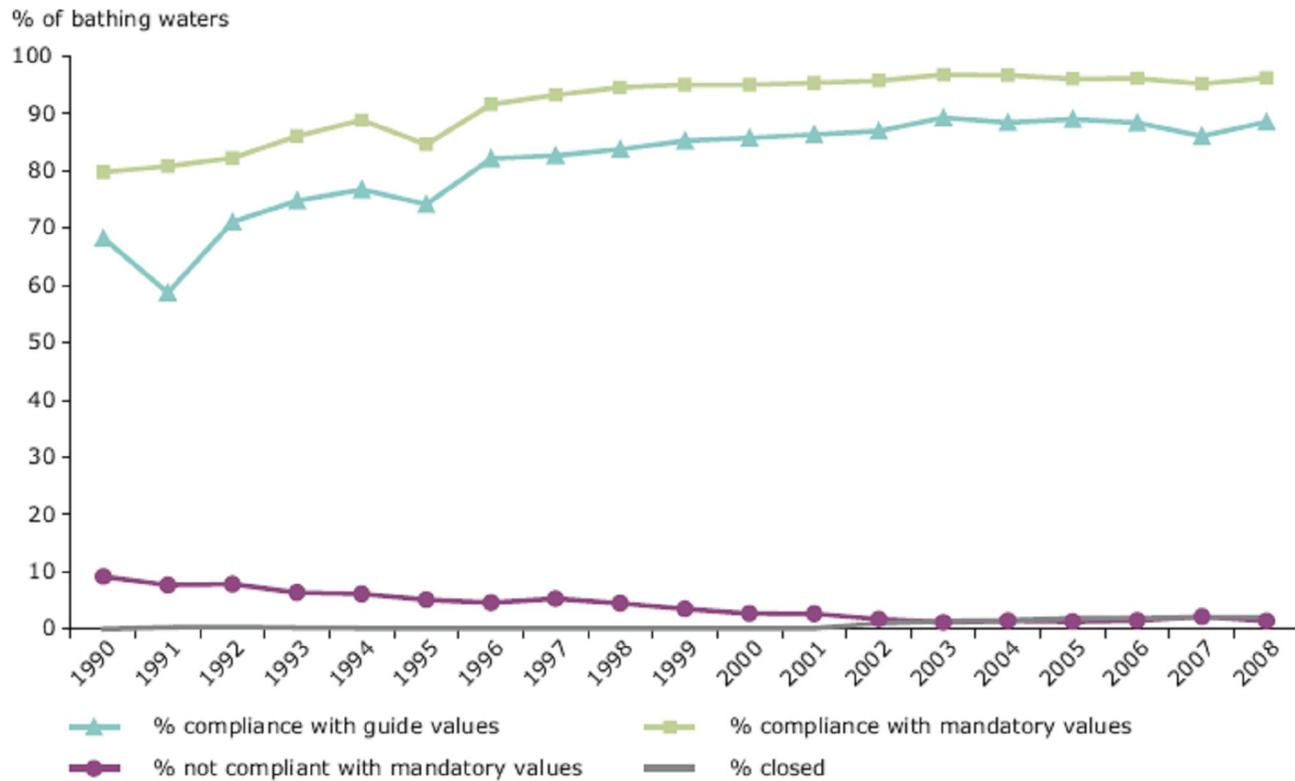
Map 6 Bathing water quality on the North Sea coast



Note: * River Basin District.
More data on bathing water quality on <http://www.eea.europa.eu/themes/water/mapviewers/bathing>.

Source: National boundaries: GISCO; large rivers and lakes: EEA; bathing waters data and coordinates: Member States' authorities.

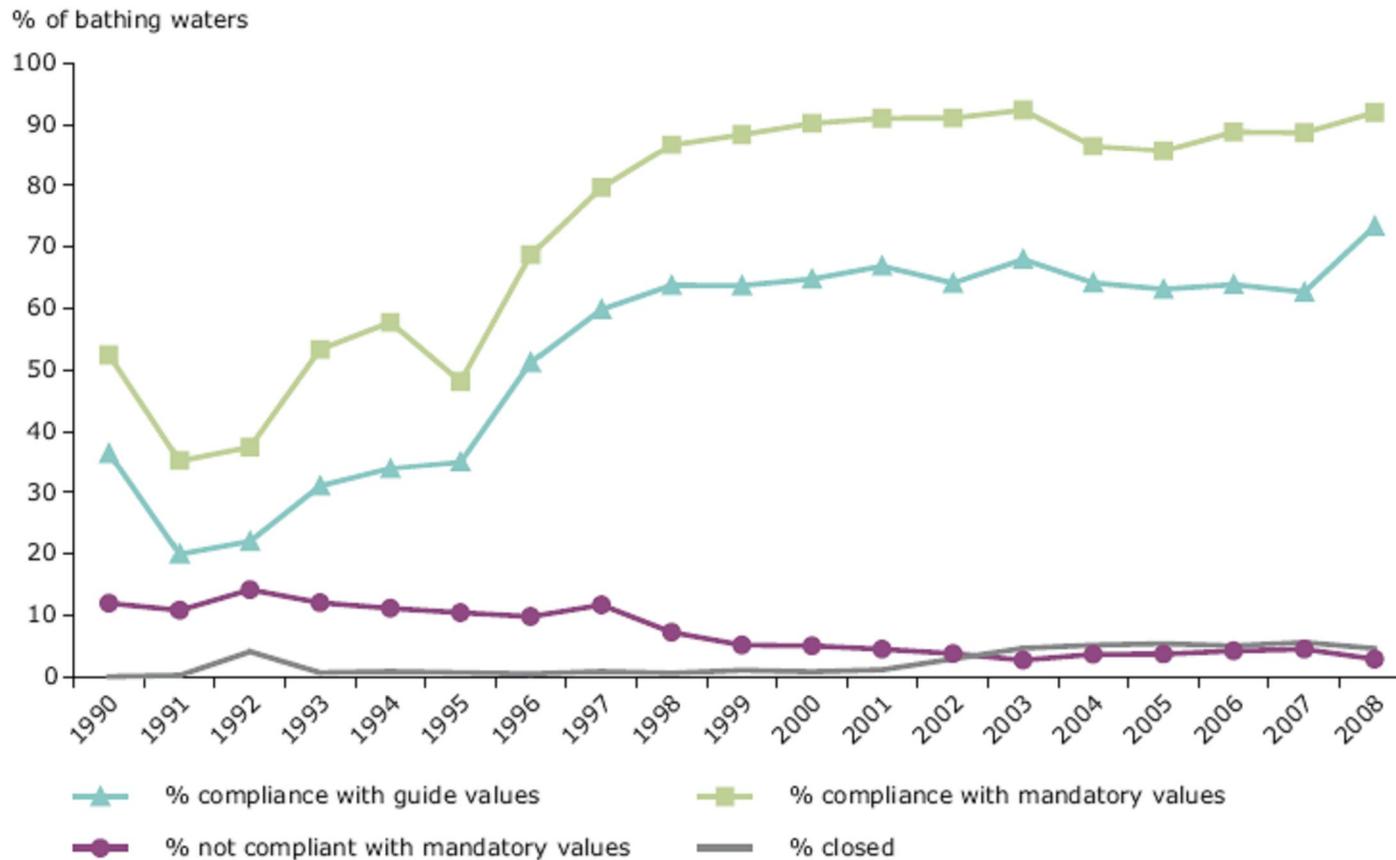
Bathing Water Quality - Coastal



Source: WISE Bathing Water Quality database based on annual reports by EU Member States.



Bathing Water Quality - Inland



Source: WISE Bathing Water Quality database based on annual reports by EU Member States.



Water Watch — Eye On Earth — EEA - Microsoft Internet Explorer provided by EEA

http://eoe.eea.europa.eu/

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To view and rate quality of a bathing site:

- Zoom in to the selected bathing site or type name into search bar
- If cluster symbol is displayed, zoom in further to individual representation
- Click on icon to display historical assessments and open pop-up rating system
- Click on other icons, for detail view on other locations
- Zoom out to go back to original view

Water watch

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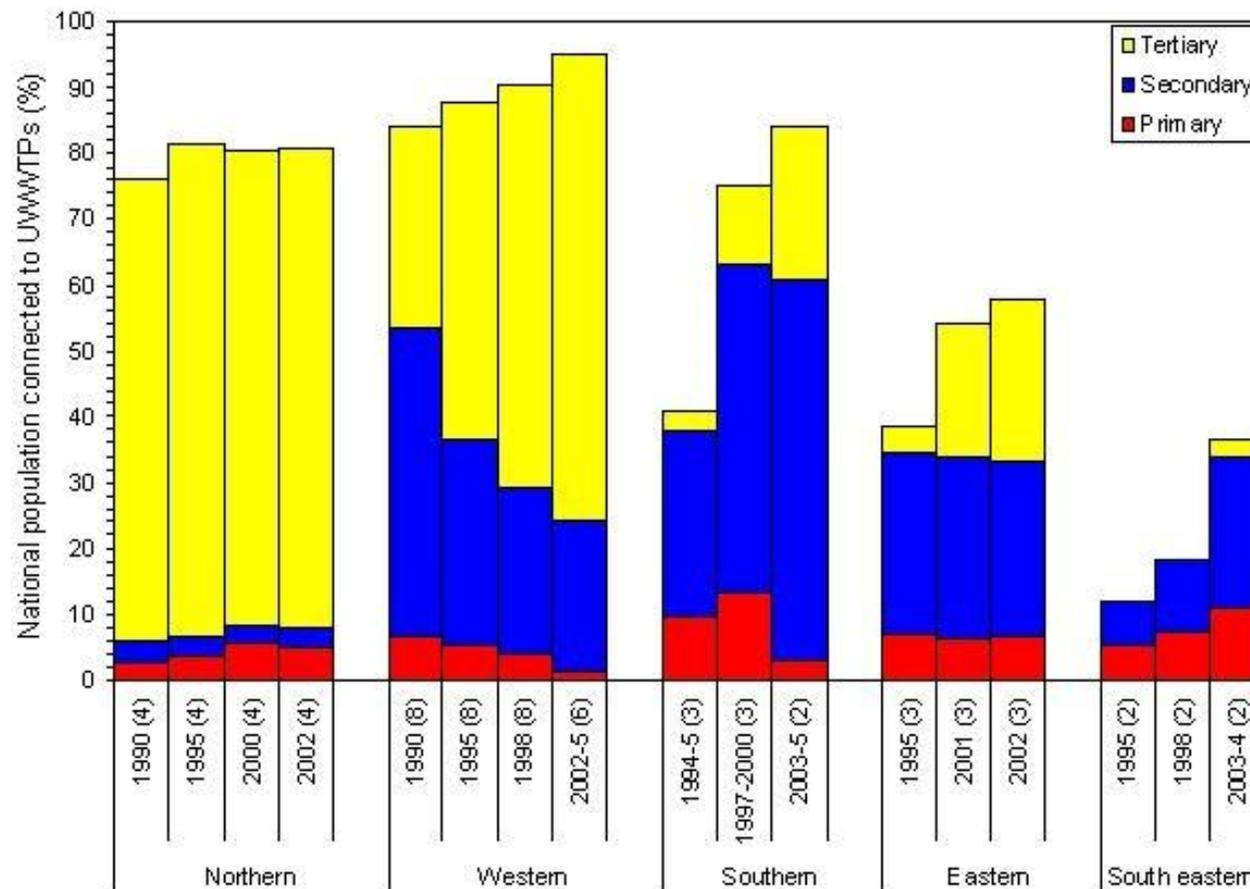
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Urban Wastewater Treatment

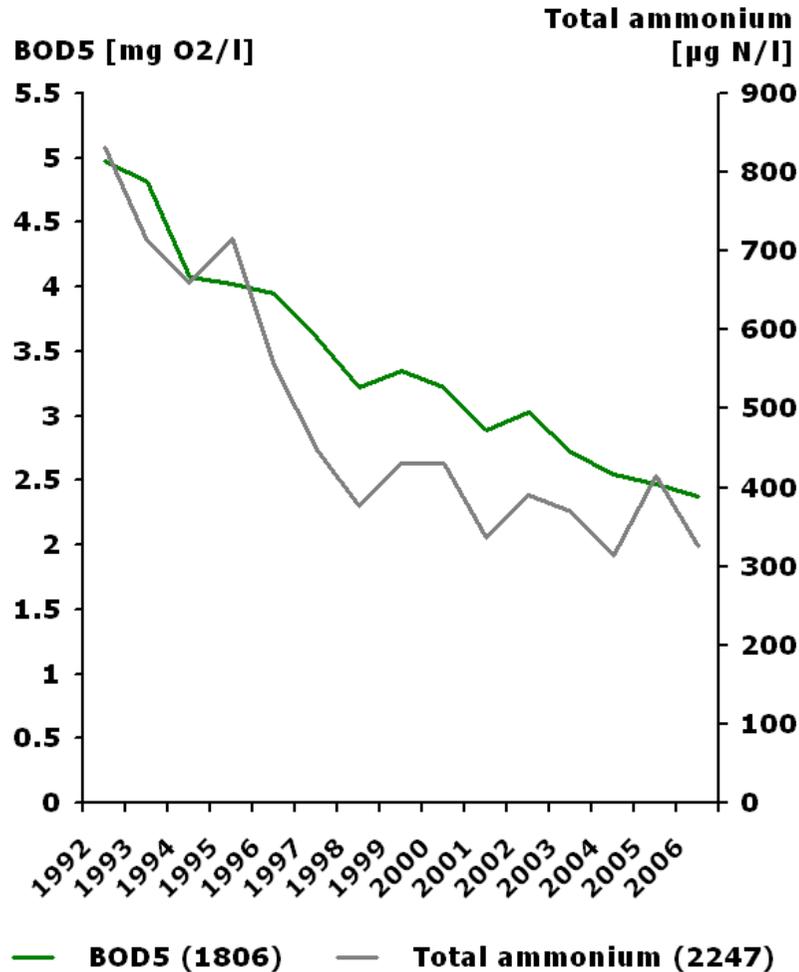
- Urban Wastewater Treatment Directive requires collection and secondary treatment
- Tertiary treatment is required for waters sensitive to e.g. eutrophication



Improved collection and treatment of wastewater over recent years



Urban Wastewater Treatment



- Clear improvement in water quality; Microbes, BOD, NH₄, Phosphorus (metals and other HS)
- Reduction in contamination of Bathing Waters
- Reduced contamination of marine biota (seafood)?



Comprehensive water
legislation in place – for
EU27 at least - but
challenges lie ahead.....



Chemicals in the Water Environment

- Emerging pollutants e.g. DEHP (plasticiser) from PVC pipes – established as a priority substance with an EQS set – but how to meet this?
- Wastewater treatment plants to play a critical role, but treatment efficiencies are rarely 100% (e.g. as for ED's and pharmaceuticals)
- Tackling emissions of chemicals at source is critical – appropriate pricing for treatment services can help drive this
- To what extent will wastewater treatment improve beyond EU27?



Risk from contaminated drinking water

- Challenge to quantify risk
- Improved information is needed to identify where polluted sources coincide with inadequate drinking water treatment



Map Source; Women in Europe for a common future (WECF)



Challenge to determine exposure and risk from different routes

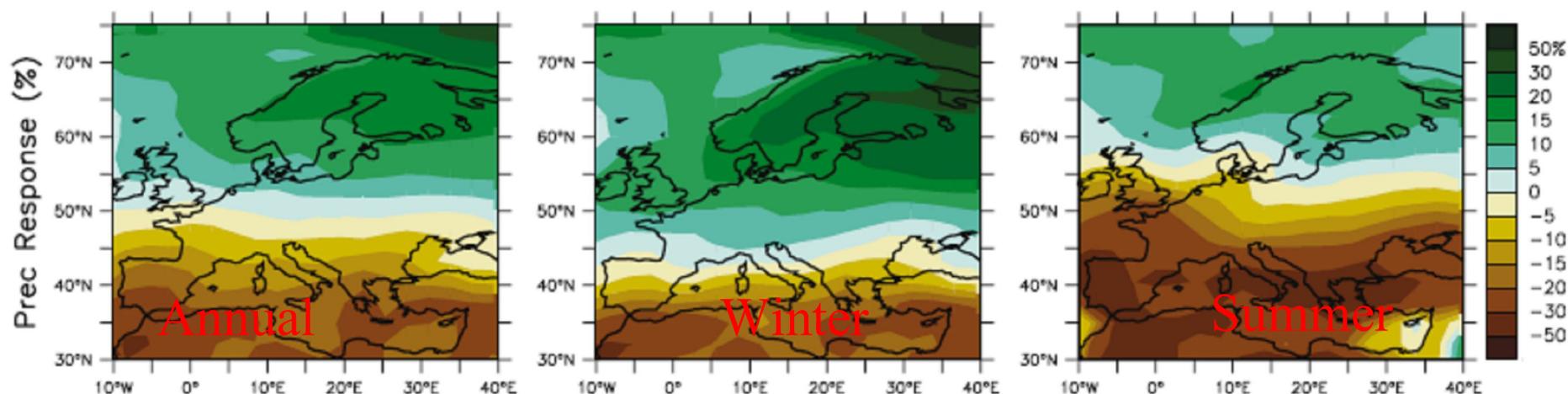
- Pesticides – potential exposure to public via;
 - handling/spillage
 - spray drift
 - terrestrial foodstuffs
 - inadequate drinking water treatment
 - consumption of seafood
- Difficult also to quantify human exposure to endocrine disruptors, e.g. consumption of seafood versus exposure to certain food packaging



Future increase in winter precipitation for northern and central Europe

Increased Flooding

Map 5.5 Modelled precipitation change between 1980–1999 and 2080–2099



Note: Left: annual; middle: winter (DJF); right summer (JJA) changes % for the IPCC-SRES A1B emission scenario averaged over 21 models (MMD-A1B simulations).

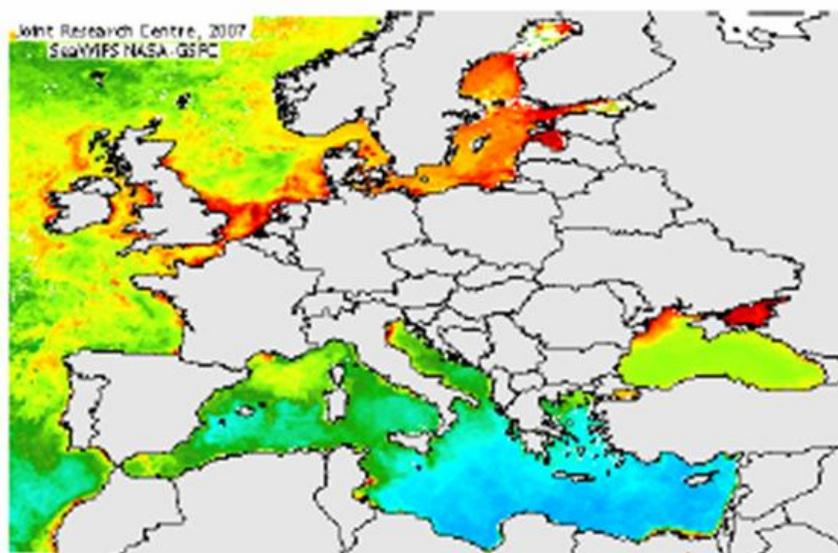
Source: Christensen *et al.*, 2007. Published with the permission of the Intergovernmental Panel on Climate Change.



Higher water temperatures to enhance growth of toxic algal blooms, microbes too?

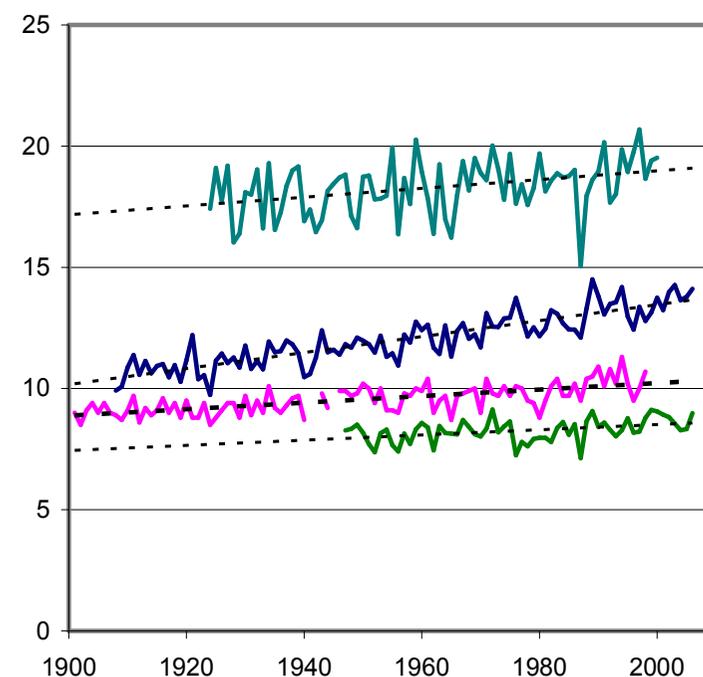
Chlorophyll-a [$\text{mg}\cdot\text{m}^{-3}$]

May - 2005



[$\text{mg}\cdot\text{m}^{-3}$]

Water temperature



— Rhine, Lobith

— Danube, Vienna

— Lake Saimaa, Finland

— Lake Võrtsjärv, Estonia



Drought and Water Scarcity

- Increased severity and frequency of drought in parts of Europe over coming decades
- Depletion of water resources typically leads to poorer quality too; less dilution of pollutants, lower O₂ levels



Drought and Water Scarcity

- Disruption to supply and an associated diminished quality; elevated sediment, aluminium, manganese etc
- Stagnant water drives greater water vectored disease (i.e. insects breeding in water)
- Management of water demand required including adaptation to climatic change



Conclusions

- A range of 'water' legislation, applicable to EU27 will act (in time) to reduce public health risk
- Questions remain as to the outlook beyond the EU27 countries
- A number of 'health and water' challenges in future years (e.g. climate change)

