

A scenic view of a lake with mountains in the background and two ducks in the foreground. The lake is calm, reflecting the sky and the surrounding greenery. In the foreground, two ducks are sitting on a concrete ledge. One duck is facing away from the camera, showing its patterned back feathers. The other duck is facing towards the camera, showing its dark head and neck. The background features a range of mountains under a clear sky, with some trees and a small boat visible on the right side of the lake.

# Nutrients and related determinands in European freshwaters

## Indicators and data

Kari Austnes / WISE-6 webinar / 04.10.2023

# Overview

## Indicator update

- WAT002: Oxygen consuming substances
- WAT003: Nutrients
- Consultation and feedback
- Changes to the indicator calculation

## Data reporting

- Data availability
- Specific issues

## WISE-6 biological data

- Draft lake chlorophyll indicator



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# Indicator update

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WAT002: Oxygen consuming substances in European rivers

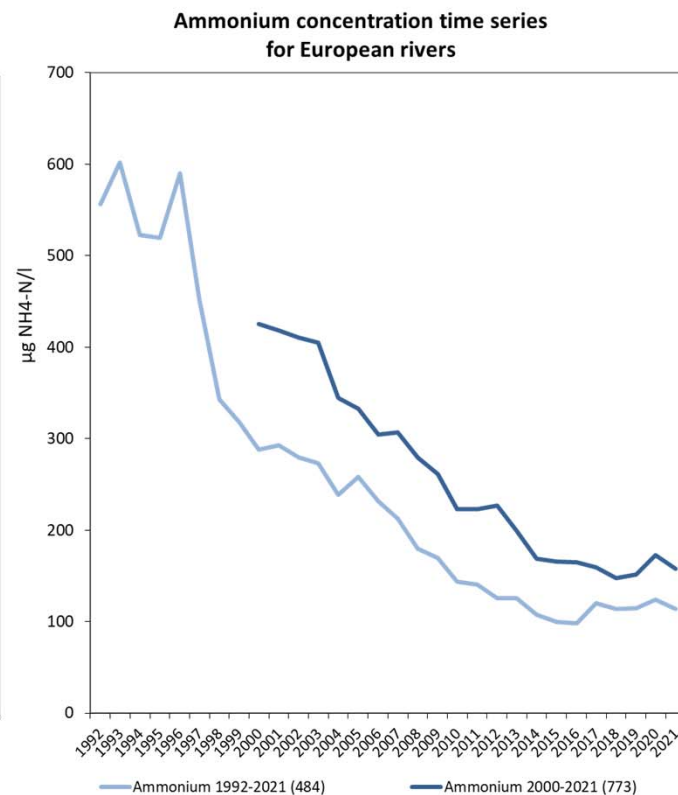
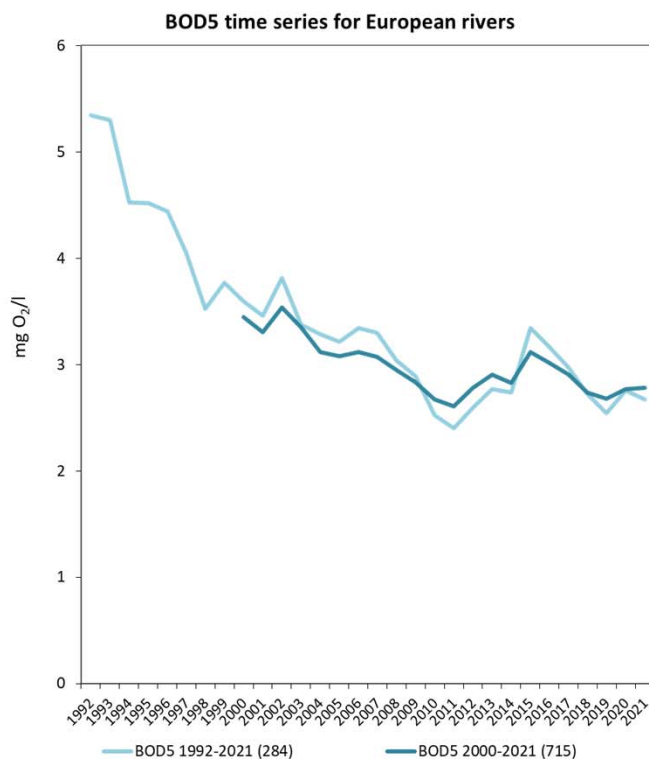
WAT003: Nutrients in freshwater in Europe

- Large inputs of nutrients or organic pollutants can lead to eutrophication or de-oxygenation
- Negative ecological impacts: Changes in species composition, species loss
- Negative impacts on the use of water: Drinking, bathing, recreation
- Main sources: Waste-water and agriculture
- Objective of several directives: WFD, UWWTD, DWD, ND
  
- Trends: Are conditions improving?
- Current status: Where do we see the largest problems now?
  
- Format: Same as last year – shorter than previously



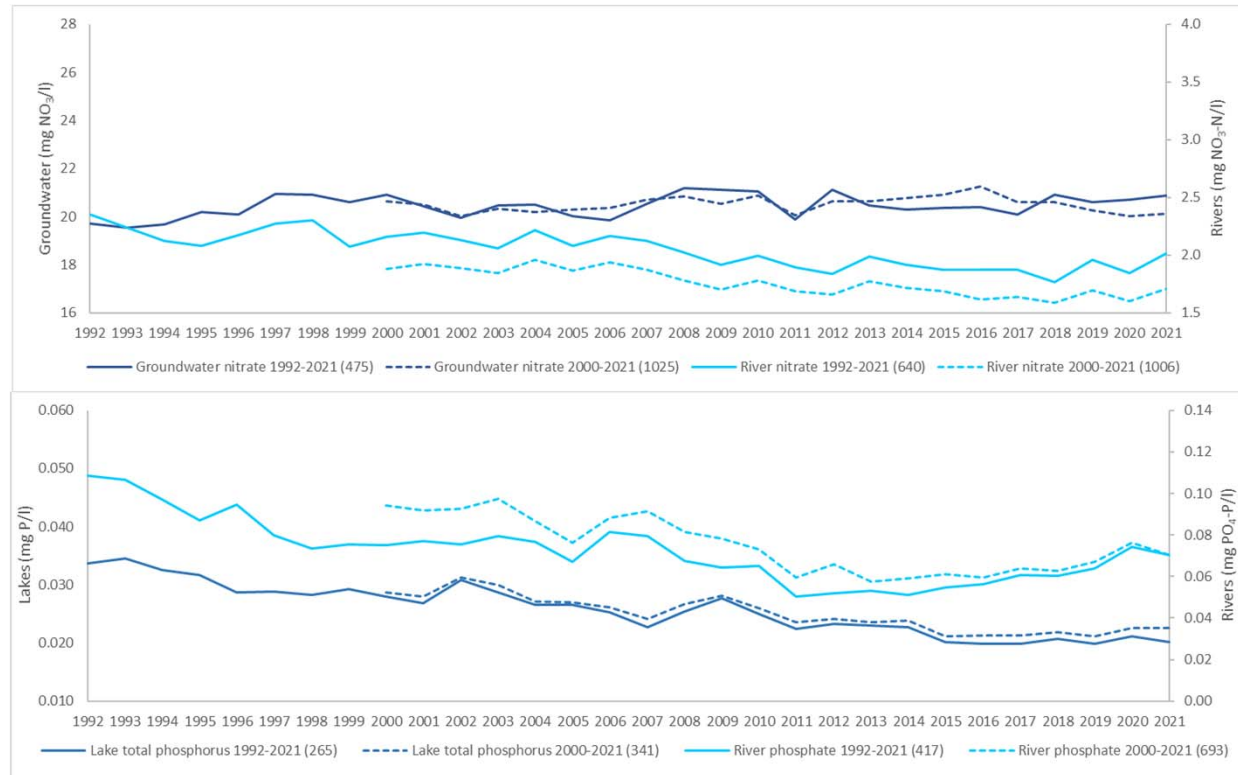
# Time series: oxygen consuming substances

- Marked decline since the 1990s
- Apparent stabilization in recent years – earlier for BOD
- For ammonium the average concentration is higher for the most representative time series

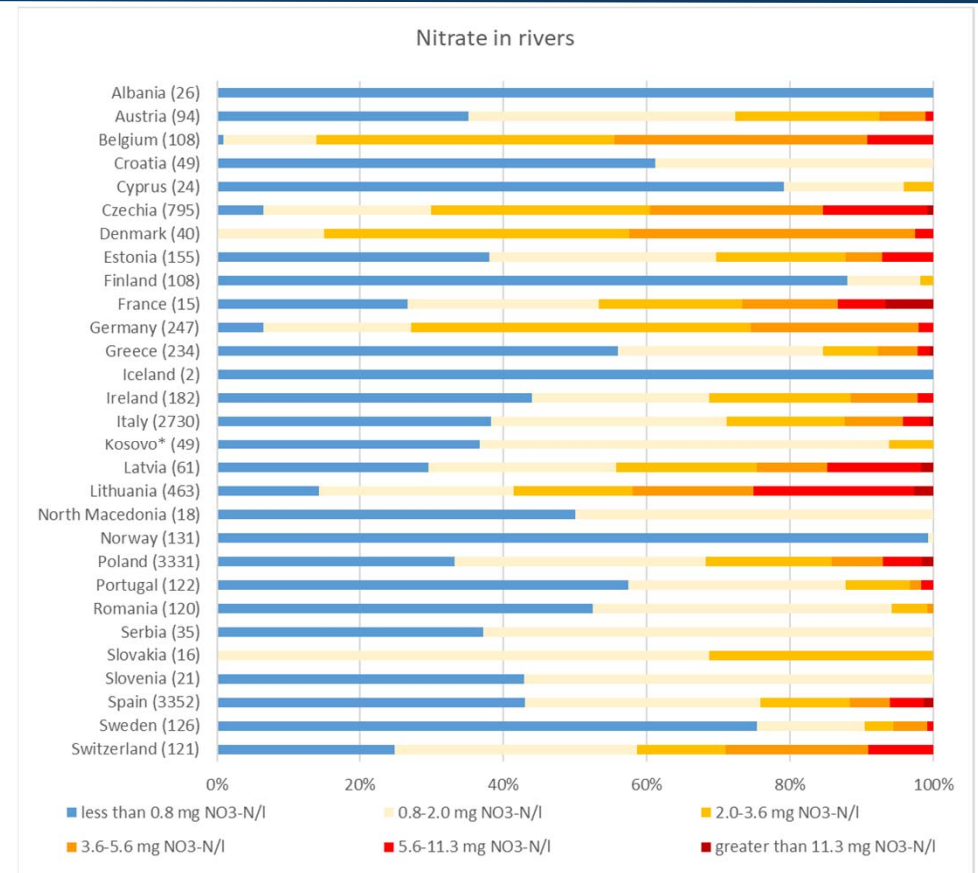
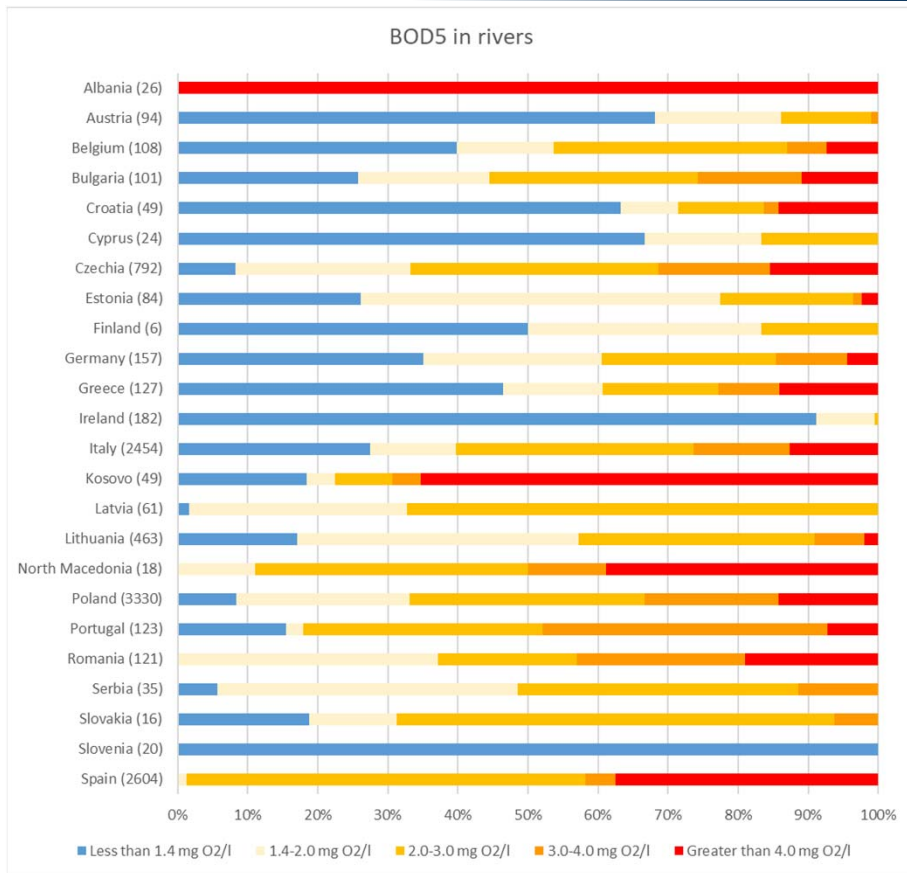


# Time series: nutrients

- Similar pattern for rivers: Marked decline, but apparent stabilization
- For river phosphate even a tendency of increase in later years
- Lake total phosphorus levelling off after gradual reduction
- Groundwater nitrate is relatively stable on average



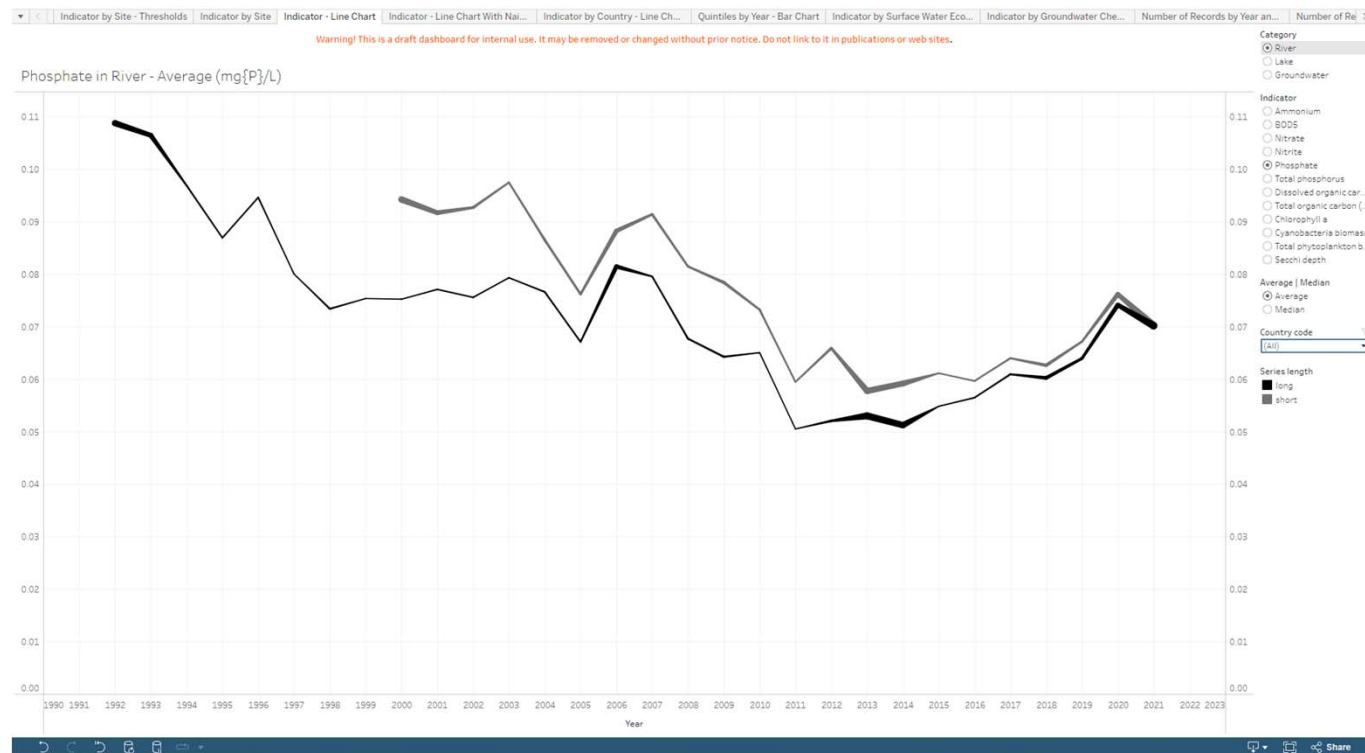
# Current status



- All sites with data in 2019-2021: Far more sites than for time series
- Large variability between countries

# Indicator developments

- Exploring alternative methodology for indicator calculation
  - Making use of more of the data through spatio-temporal statistical modelling
  - Aim to improve representativity
- Dashboards useful tools - as supplied with consultation
  - No further development this year
  - Aim to make them (even more) user friendly and easily accessible (WISE Freshwater platform)



# Indicator consultation

- All feedback highly appreciated
- We are not able to implement all suggestions
  - Limitations in the indicator format – short text, few aspects and little detail can be covered
  - Budget limitations – major changes to the calculation requires additional resources
- Even when we have not made major changes to the indicators, the data will always change
  - Very useful that you check the data from your country – any reported errors will be corrected
- Methodological suggestions are always welcome
  - Even if we may not be able to implement them in the indicators, we may bring the ideas on to other assessments
- Feedback from this year's consultation that we will bring on
  - When opening the consultation, we will inform about changes from previous year's indicator
  - We will reconsider the time span of the time series
    - A later start year would give more spatially representative times series





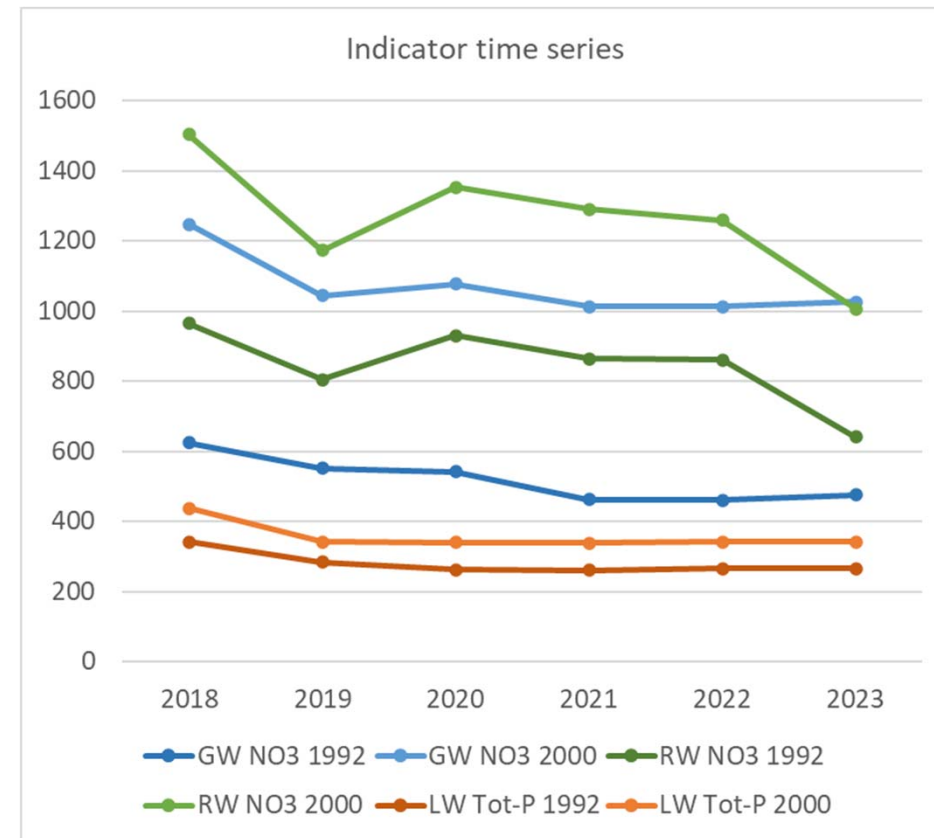
# Indicator calculation

- No major changes since previous years
- Clearly defined rules for LOQ issues
  - New [max limits for LOQ](#) for selected determinands (including indicator determinands)
  - Several new LOQ-related QC flags
  - Disaggregated records are excluded from the indicators when
    - LOQ is higher than max limit or below zero
    - the observed value is reported as not being below LOQ, but the reported value is lower than LOQ
    - LOQ is missing and the result value is reported as being below LOQ
  - For aggregated data we exclude records where
    - LOQ is below zero and the mean value is reported as being below LOQ
    - LOQ is missing and the mean value is reported as being below LOQ
  - For aggregated records from before 2013 the mean value is not replaced by LOQ where the mean is reported as being below LOQ
  - If no disaggregated values are reported as being below LOQ, the calculated aggregated value is treated as above LOQ no matter what the aggregated LOQ is
- Please check if your data has LOQ-related metadata statements ([waterbase](#) or [discodata](#))



# Indicator data

- Number of complete time series declining
  - Gaps > 3 years not accepted
  - If reporting stops, sites can no longer be included
- We are also losing time series due to
  - Gaps within time series
    - Does data exist? Please submit along with new data
  - Step changes, potential unit issues or outliers
    - Please check the metadata statements starting with QC\_OUTLIER\_...
  - Station code changes giving breaks in time series
- Countries have been/will be contacted, but please also ask – we keep lists of specific issues
- Data can be re-submitted as corrected (new values) or confirmed (resultObservationStatus = 'A')



## Some final data issues

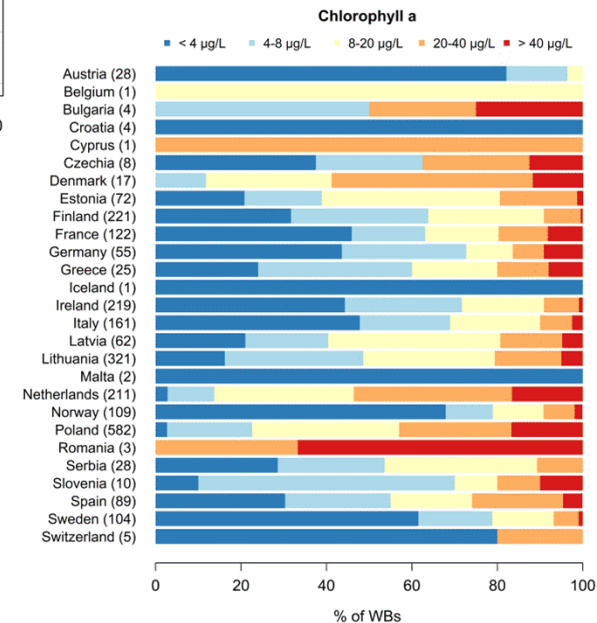
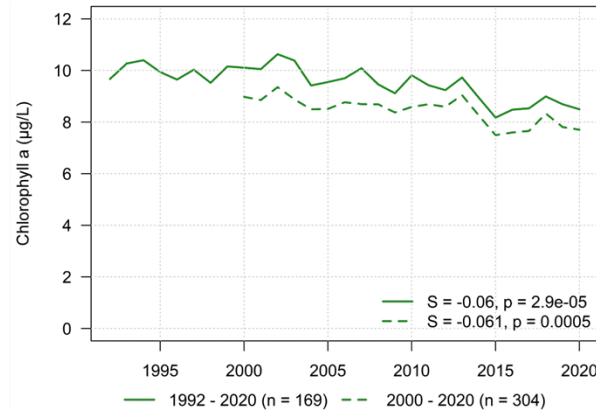
- Please report disaggregated data when possible
- Please report the correct fraction: “Matrix where the measurement has been made”
  - W: Analysis on the whole water sample
  - W-DIS: Analysis on the filtered water sample
  - W-SPM: Analysis of the fraction remaining on the filter

	total	dissolved	dissolved,total	spm	spm,total
Ammonium	269,745	42,805	3,708	5,794	
BOD5	98,619	8,159	1	5,334	
Chlorophyll a	43,867	300	5	1,811	
Cyanobacteria biomass	932				
Dissolved organic carbon (DOC)	16,873	22,901	414	2	
Nitrate	276,734	51,509	10,736	156	
Nitrite	242,441	42,811	2,782	155	
Phosphate	194,363	38,826	891	145	
Secchi depth	18,658	814		154	
Total organic carbon (TOC)	75,229	10,916	3,530	5,208	
Total phosphorus	165,568			5,806	8
Total phytoplankton biomass	1,345				
	1,404,374	219,041	22,067	24,565	8



# WISE-6 chlorophyll data

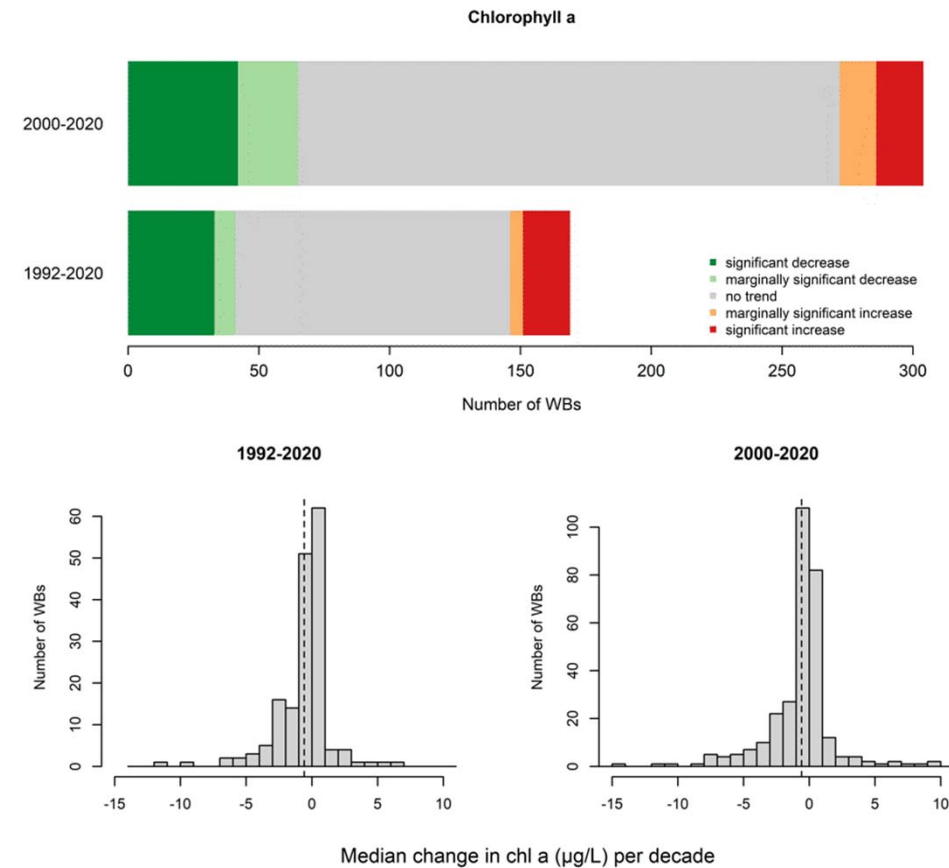
- Draft indicator on lake chlorophyll produced in 2022 – to be updated in 2023
  - Currently not in line to be adopted as new, official indicator
  - Results to be used for larger assessment
- Similar approach as for the other indicators
  - Fewer time series available – more data most welcome
  - Always possible to submit older data
- Improving conditions
  - Average concentrations declining
  - Some countries still have a large share of lakes with chlorophyll > 20 µg/L



# WISE-6 chlorophyll data

- Visualising trend analysis results
  - More lakes with decreasing than increasing trends
  - Most lakes no significant trend
  - Most lakes show small changes, but larger changes are seen, in particular for decreasing trends

- NOTE: Data on cyanobacteria and phytoplankton biomass also explored and highly useful
  - More data would increase spatial representativity



# Questions for discussion

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- Concentrations appear to be stabilizing in many cases – any reflections on possible reasons? Is this also the impression in the national analyses?
- Do you have any thoughts on the indicator calculation in terms of spatial representativity? Currently we simply average across all sites, despite highly varying number of sites per country
- Are there parts of the data dictionary or other instructions that are ambiguous or difficult to understand?



Thank you

