



# Lessons learned on monitoring, assessment and data exchange in the Rhine Basin

# Where do I come from?



Clker-Free-Vector-Images from Pixabay



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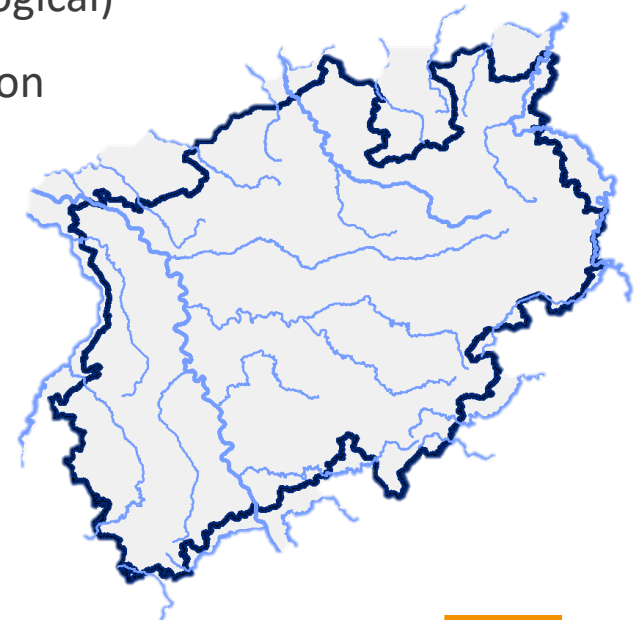
- North Rhine Westphalian State Agency for Nature, Environment and Consumer Protection, Germany  
→ LANUV NRW
- State: North Rhine-Westphalia (NRW)
- 1.700 measuring sites → monitoring



# Where do I come from?



- North Rhine Westphalian State Agency for Nature, Environment and Consumer Protection, Germany  
→ LANUV NRW
- State: North Rhine-Westphalia
- 1.700 measuring sites → monitoring (chemical & biological)
- River Rhine important role → drinking water production
- Supraregional view on the large rivers → UNDINE  
[https://undine.bafg.de/index\\_en.html](https://undine.bafg.de/index_en.html)
- Information platform on hydrological extreme events (floods, low flow)



# ICPR – international cooperation



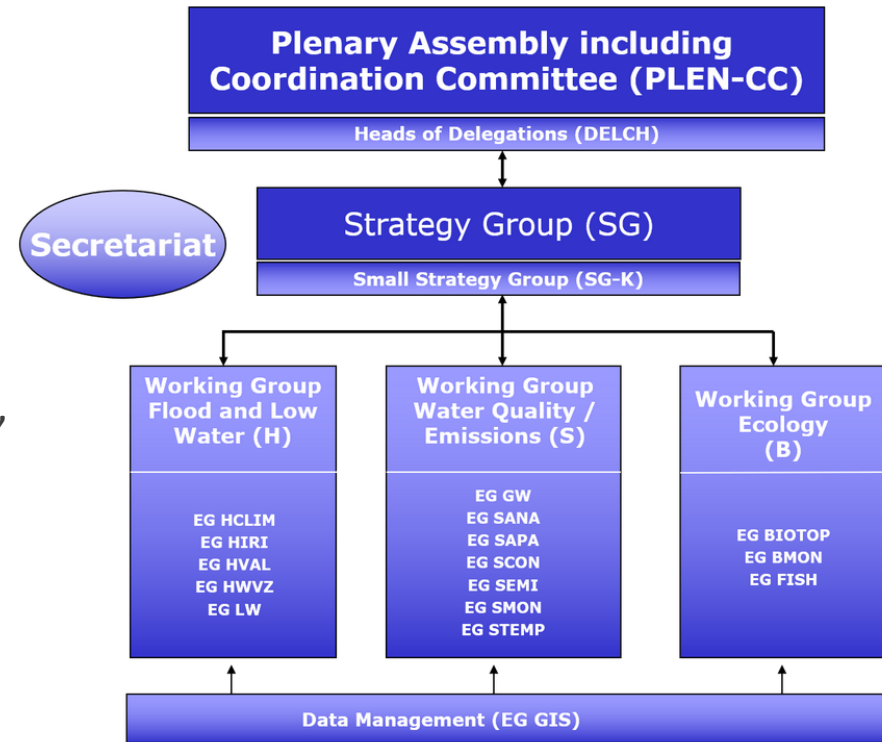
- International Commission for the Protection of the Rhine, founded in 1950
- 9 states in the Rhine catchment area



# ICPR – international cooperation





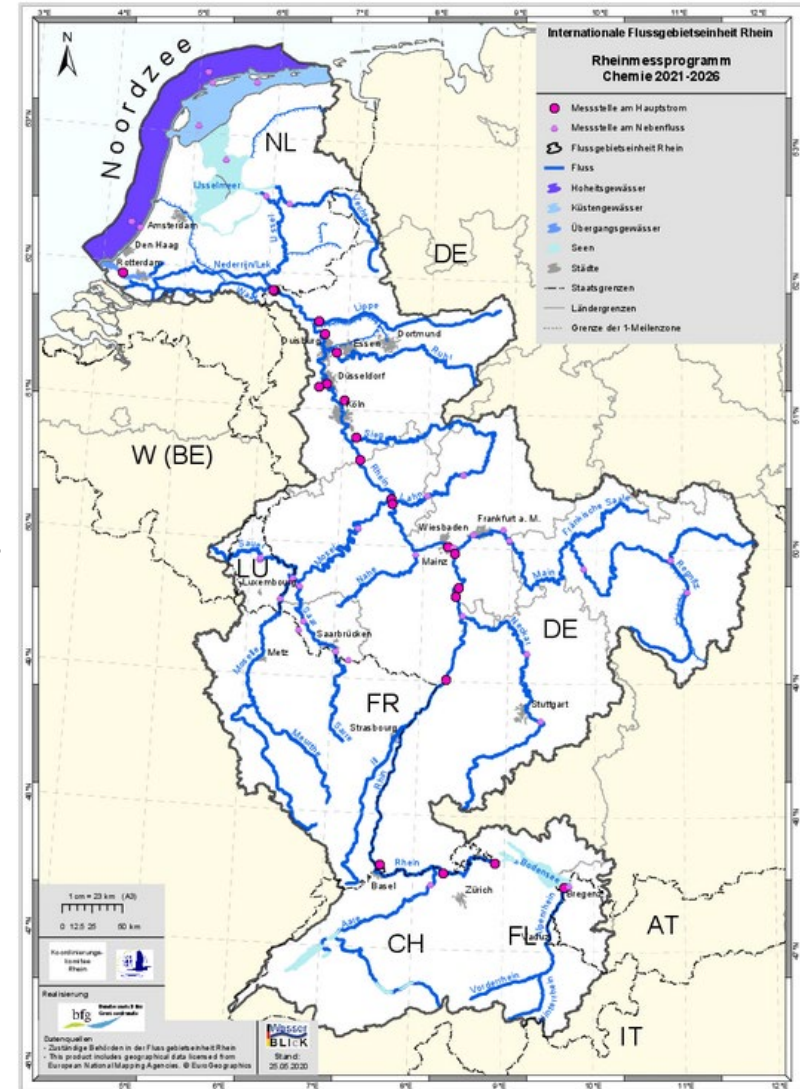
- International Commission for the Protection of the Rhine, founded in 1950
  - 9 states in the Rhine catchment area
  - Cooperation based on legally binding conventions
  - Delegations work with a political mandate, do have the technical know how
  - Decision making by consensus
  - Legal framework: EU Directives (WFD and FD) and national legislation
- e. g. Rhine Measurement Programme Chemistry





# ICPR – Rhine programm

- Rhine 2040   
<https://www.iksr.org/en/icpr/rhine-2040>
  - Further reduction of emissions/discharges
  - The water quality must be such that simple and natural treatment is sufficient for the production of drinking water
  - Biodiversity, water quality, floods, low water
  - Rhine Measurement Programme Chemistry
    - selection of the measuring points
    - joint measurement programme
    - data available 
    - regularly updated, 2021 – 2026
- evaluation reports



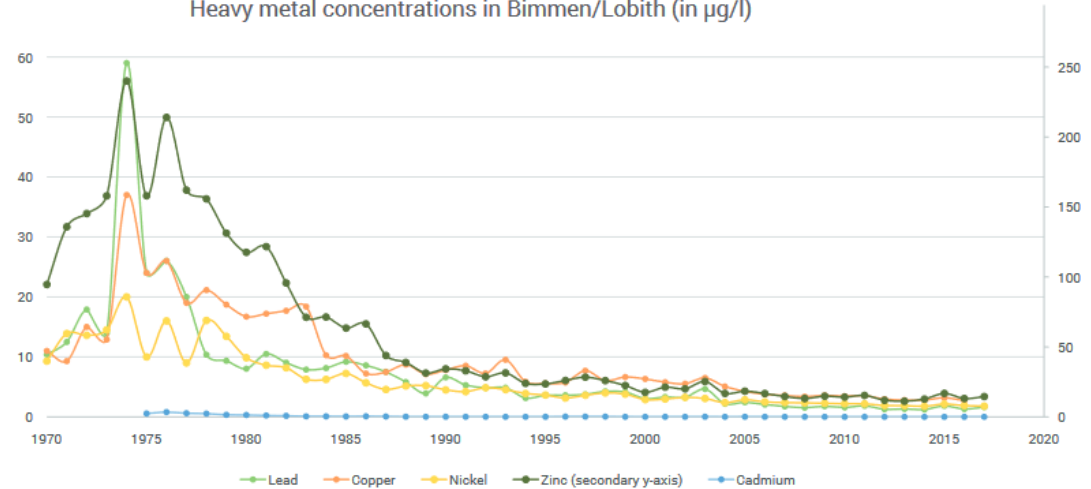
‘Assessment and development of Rhine water quality 2017-2018’



# ICPR – Water quality improvement



Heavy metal concentrations in Bimmen/Lobith (in  $\mu\text{g/l}$ )



- The story of the river Rhine is a success story given the improvements achieved in its water quality.





# LANUV – New issues

- More than 100 million substances are produced worldwide
- Many different methods (e. g. gas and liquid chromatography coupled to mass spectrometry), only targets  
→ LC-High-resolution mass spectrometry (HRMS)





# Rhine Project NTS



- Development of a tool for:
- An automated detection of emissions
- Classification and identification of pollution sources
- Easier identification of unknown substances
- Harmonised LC-method
- Use of the same internal standards
- All data is located on one platform




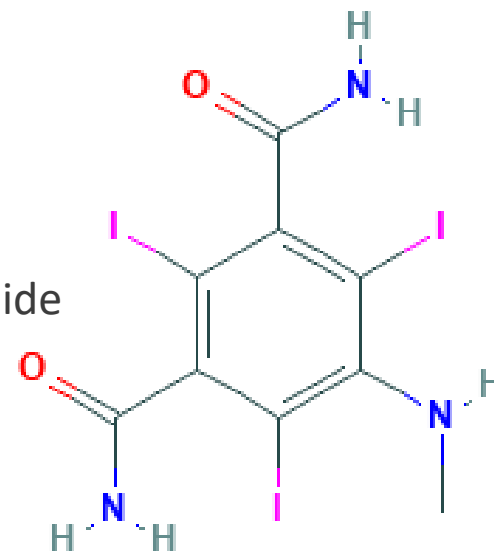
<https://www.iksr.org/en/iksr/rhein-2040/rhine-project-non-target-screening>



# Rhine Project NTS




- Unknown 571.7824
- $\rightarrow \text{C}_9\text{H}_8\text{I}_3\text{N}_3\text{O}_2$
- 2,4,6-Triiodo-5-(methylamino)benzene-1,3-dicarboxamide
- Cat. 3 
- Similar to X-ray contrast agents

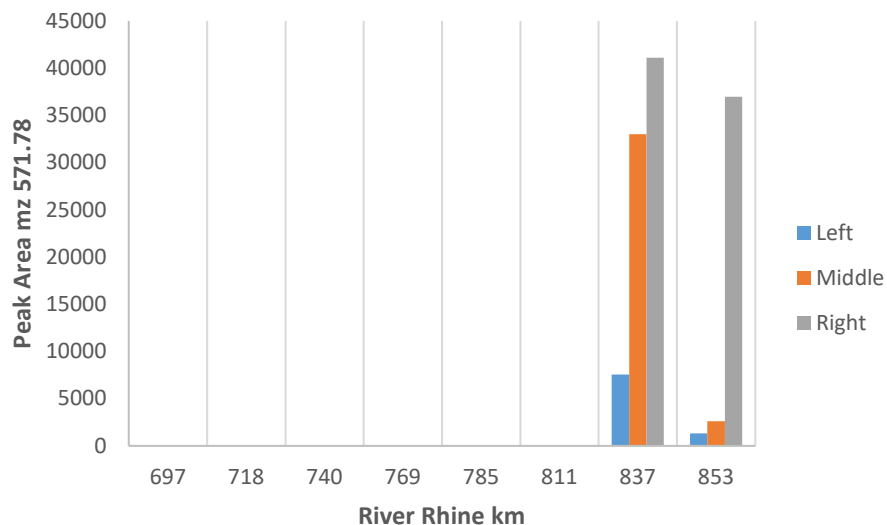


# Rhine Project NTS

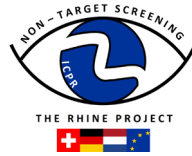



- Unknown 571.7824
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River Rhine Cross-Profile NRW (27.09.2022)



# Rhine Project NTS



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- 2,4,6-Triiodo-5-(methylamino)benzene-1,3-dicarboxamide
- Cat. 3 
- Similar to X-ray contrast agents
- River Lippe is tributary
- Company that produces X-ray contrast agents
- Discharge of the waste water treatment plant → Unknown 571.7824
- Iopromide 136 µg/L
- District government is informed



# Lessons learned

- River Rhine is a success story
- Water quality and biodiversity have improved
- Still a long way to go
- New techniques – new chances
- LC-HRMS is an outstanding technique
- Quantitative and qualitative information (Targets and Suspects)
- Lots more information (Non Targets)
- You have to work together
- Cooperation is challenging, but it is worth it

Thanks for your attention!

