Bayerisches Landesamt für Umwelt

# Monitoring of selected biocides – experiences from Bavaria

Dr. Manfred Sengl

Bavarian Environment Agency

Workshop on biocides, Berlin 05.11.2012

# Outline

- introduction
- cybutryne
- triclosan and triclosan-methyl
- biocides also used as pesticides
- conclusions

# Monitoring activities in Bavaria

- **no** systematic approach for biocides
- in general: surveillance monitoring according to WFD, regional monitoring programmes
- monitoring of selected biocides dependent on analytical possibilities
- cybutryne in water, triclosan and triclosan-methyl in water, suspended solids and biota
- some data for tin-organic compounds

- monitoring for biocides also used as pesticides
  - lots of data in surface and ground waters
  - some data collected for compliance with former directive 76/464/EC

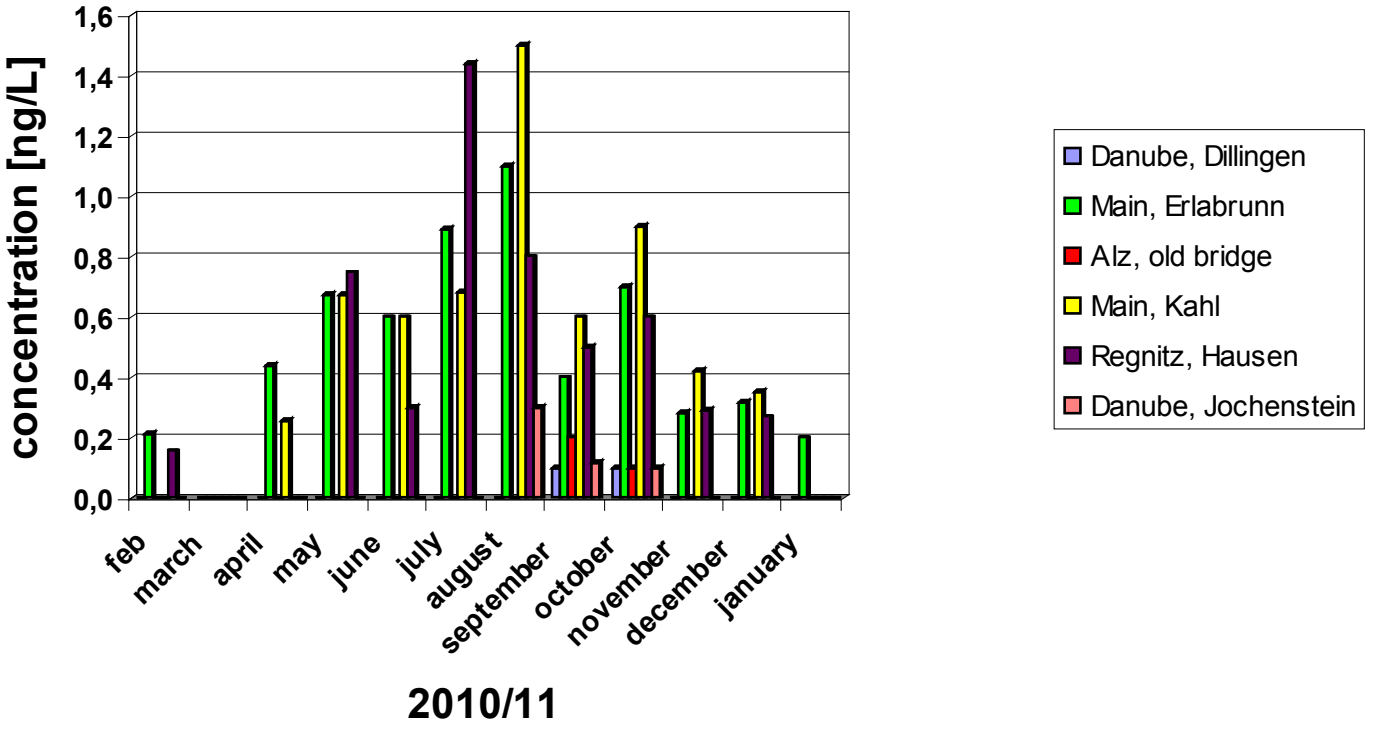
# Cybutryne

- anti-fouling agent for boats, also other applications
- substitute for tributyl-tin since the 80ies
- risk assessment: inhibits photosynthesis, very toxic to aquatic macrophytes and algae
- UBA (Berlin) mesocosm study (e.g. effects on biomass growth – $EC_{10}$ - at concentrations ≥ 0,06 µg/l) and collection of monitoring data in Germany (inland waters)

- cybutryne is a candidate for the new list of WFD priority substances; proposed AA-EQS 0,0025 µg/l and MAC-EQS 0,016 µg/l for inland waters

- data in Bavaria:
  - 2010/11 monitoring campaign in large rivers
  - 2012 monitoring campaign in small river

# Monthly analysis for selected bigger rivers 2010/11



# Cybutryne - analysis of smaller rivers 2012

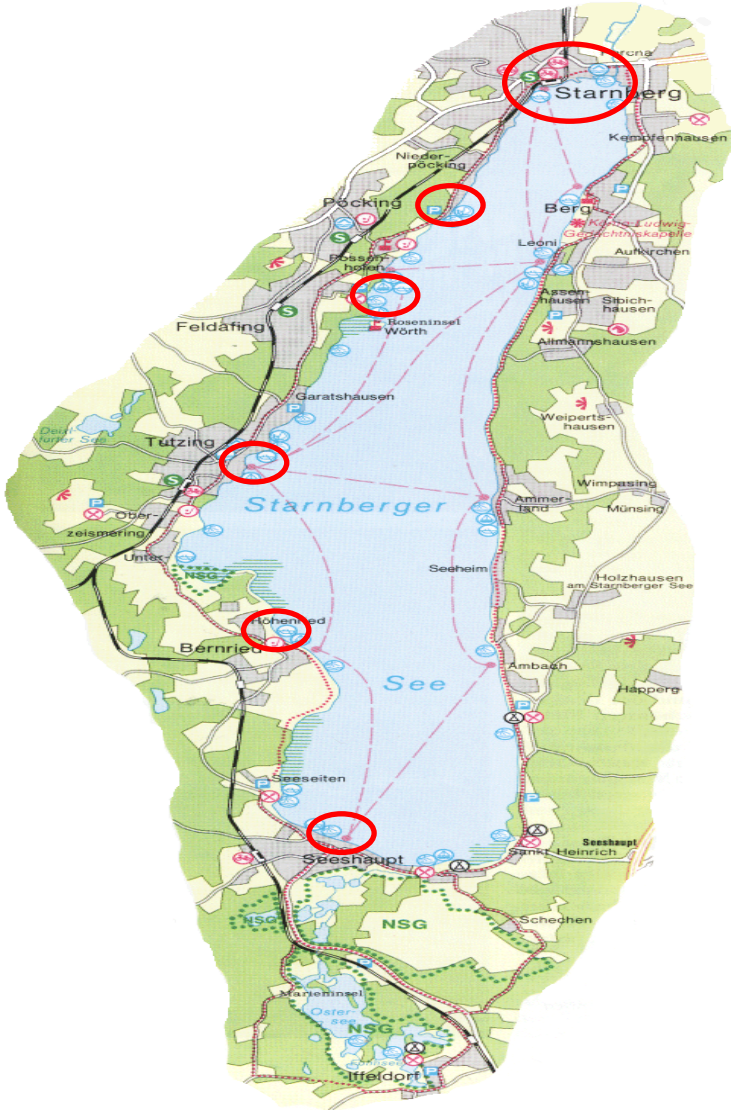
| river | number of samples | positive results | min (ng/L) | max (ng/L) |
|---|---|---|---|---|
| Bibert | 13 | 5 | nd | 0,4 |
| Eger | 11 | 5 | nd | <0,4 |
| Große Laber | 19 | 17 | nd | **1,3** |
| Pfatter | 11 | 11 | <0,4 | 0,5 |
| Rott | 11 | 4 | nd | <0,4 |
| Sächsische Saale | 12 | 7 | nd | 0,5 |
| Vils | 11 | 5 | nd | <0,4 |
| Schulmühlbach | 12 | 0 | nd | nd |

# Cybutryne in Lake Starnberg

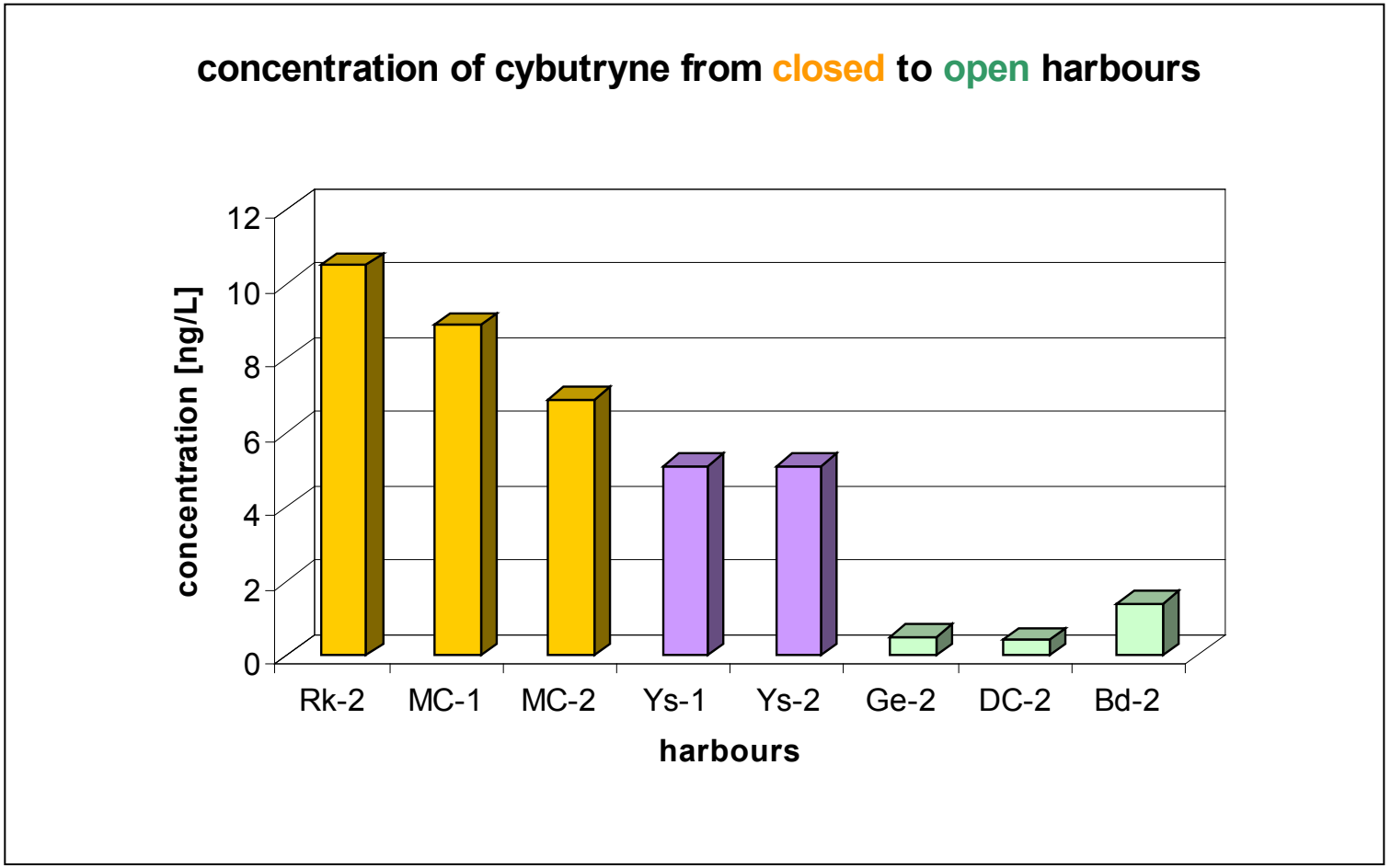
- sampling of 6 harbours in March, May and September 2010 (project in cooperation with TU Munich)

**possible impacts:**

- sampling close to contaminated slipping facilities
- number of boats in harbour
- intensitiy of boat-usage differs during the year
- type of harbour (close, open to lake)

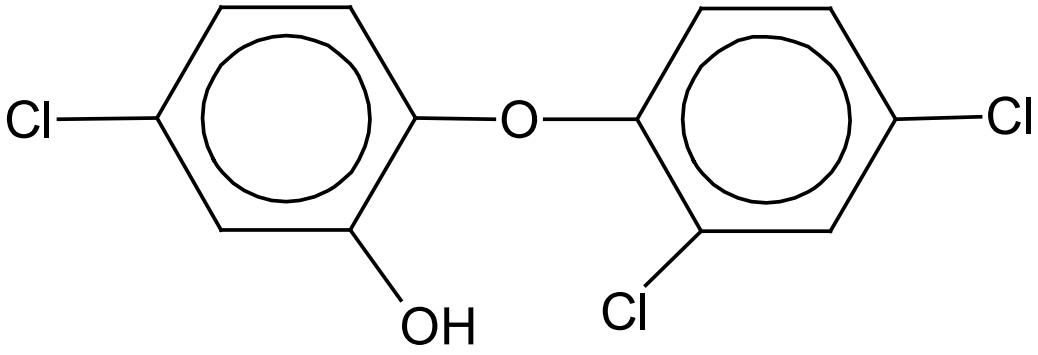


# Mean concentrations in harbours at Lake Starnberg




analysis of sediments in 2011 in harbours: up to 120 µg/kg dry mass

# Triclosan (5-Chlor-2-(2-4-dichlorophenoxy)phenole



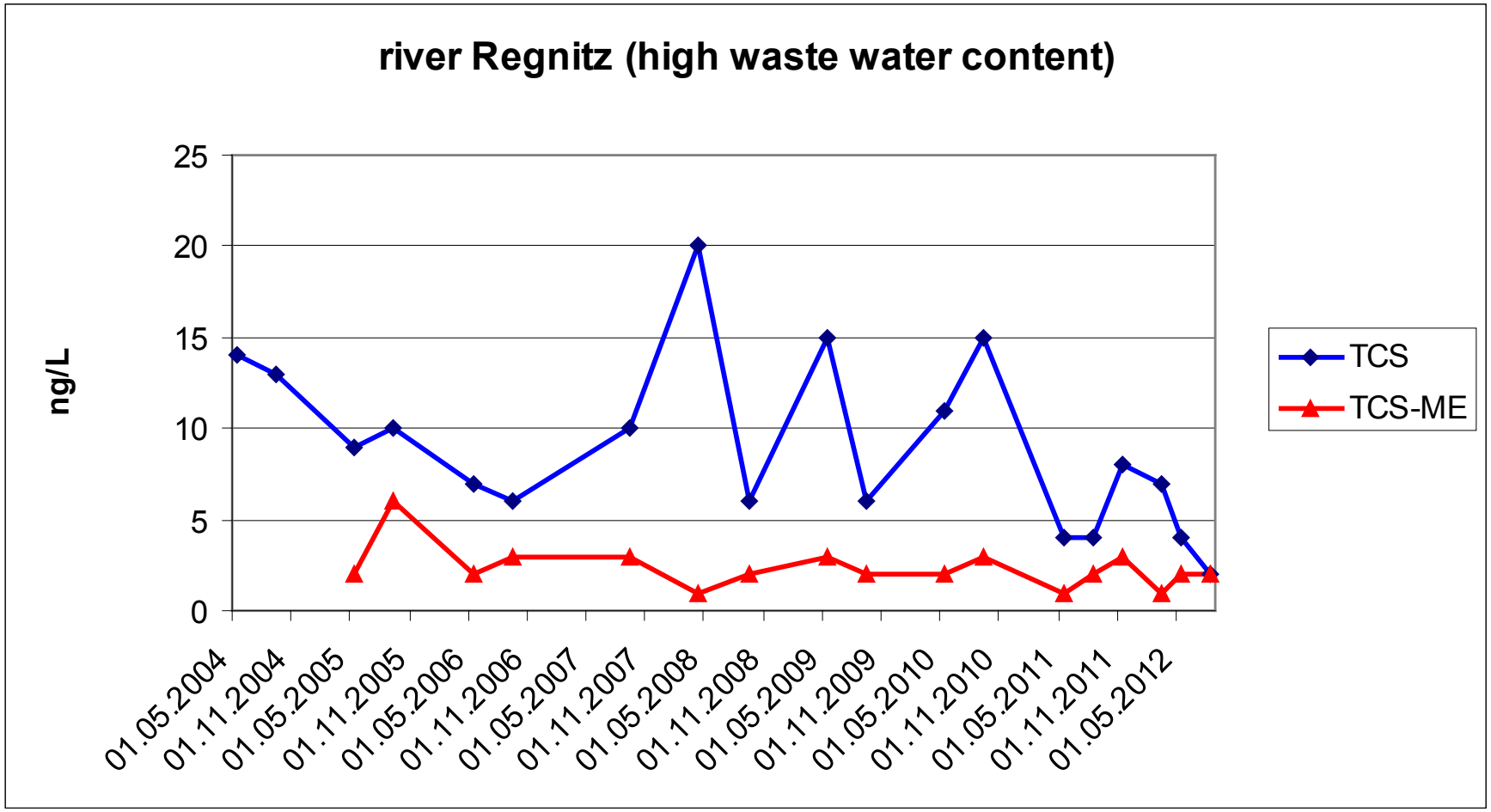

**triclosan-methyl** (metabolite)

available data:

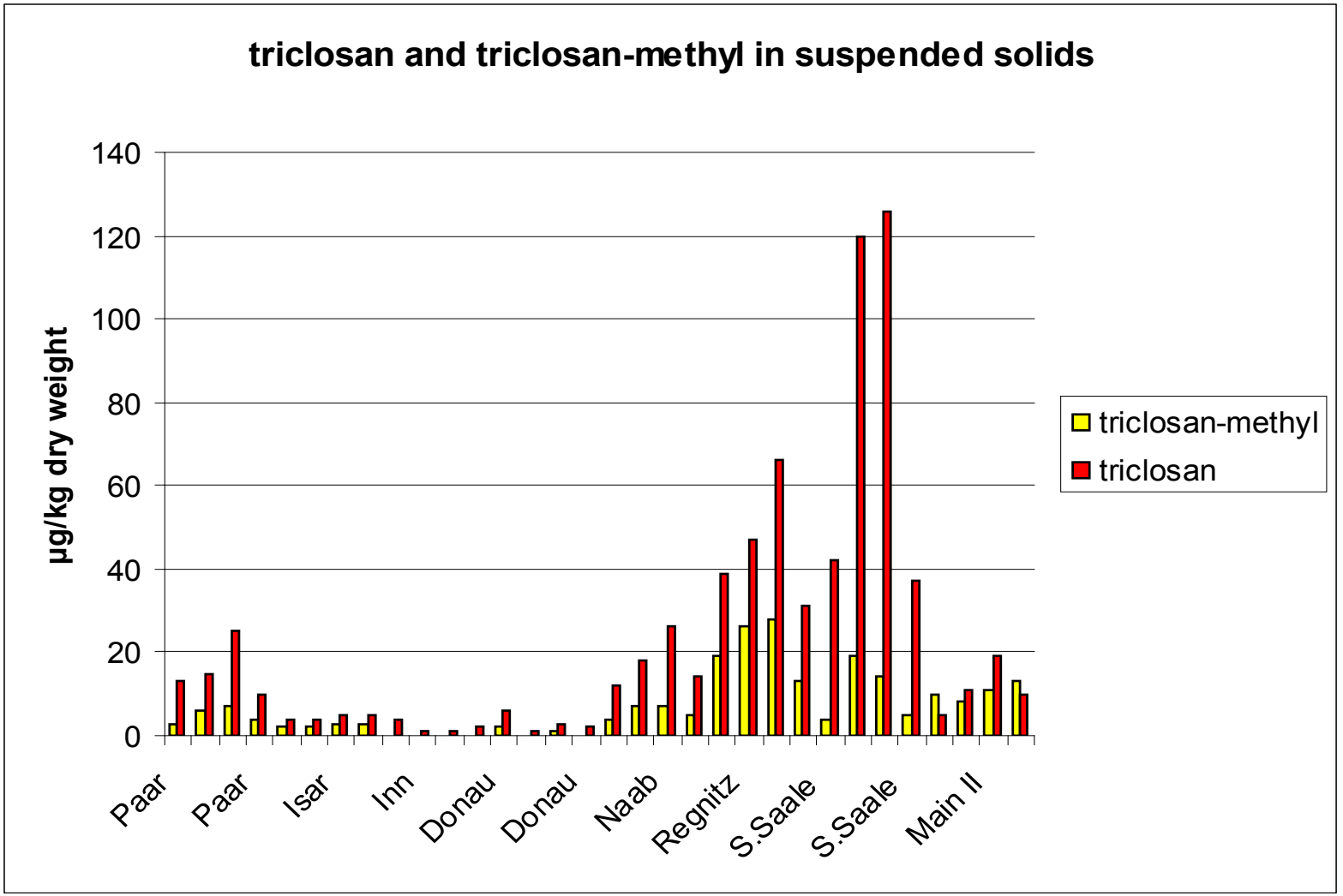
surface waters and suspended solids

biota: wild fish, carps from bioaccumulation ponds, mussels

# Triclosan and triclosan-methyl in river waters (whole sample)



# Suspended solids (sampling with centrifuge 2011/12)



# Triclosan-methyl in biota

| type of samples | n | year | min (µg/kg fw) | max (µg/kg fw) | median (µg/kg fw) |
|---|---|---|---|---|---|
| carps (muscle) from bioaccumulation ponds at WWTP | 27 | 2003 | < 1 | 90 | 15 |
| fish (muscle) from Bavarian Rivers (different species) | 55 | 2003 | < 1 | 34 | 2 |
| fish (muscle) from Bavarian Rivers (different species) | 48 | 2004 | <1 | 12 | 3 |
| mussels (dreissena polymorpha) - active monitoring in Bavarian rivers | 24 | 2003/04 | <1 | 25 | 5 |

# Biocides also used as pesticides

- IME-report 2012: 81 biocides listed that have/had an authorisation as pesticides (status as of 2010)
- 21 of these biocides monitored in smaller rivers (ca. 10 sampling sites taking 17 samples/year, 72h composite samples; LC-MS/MS)
- data for large rivers collected for many years

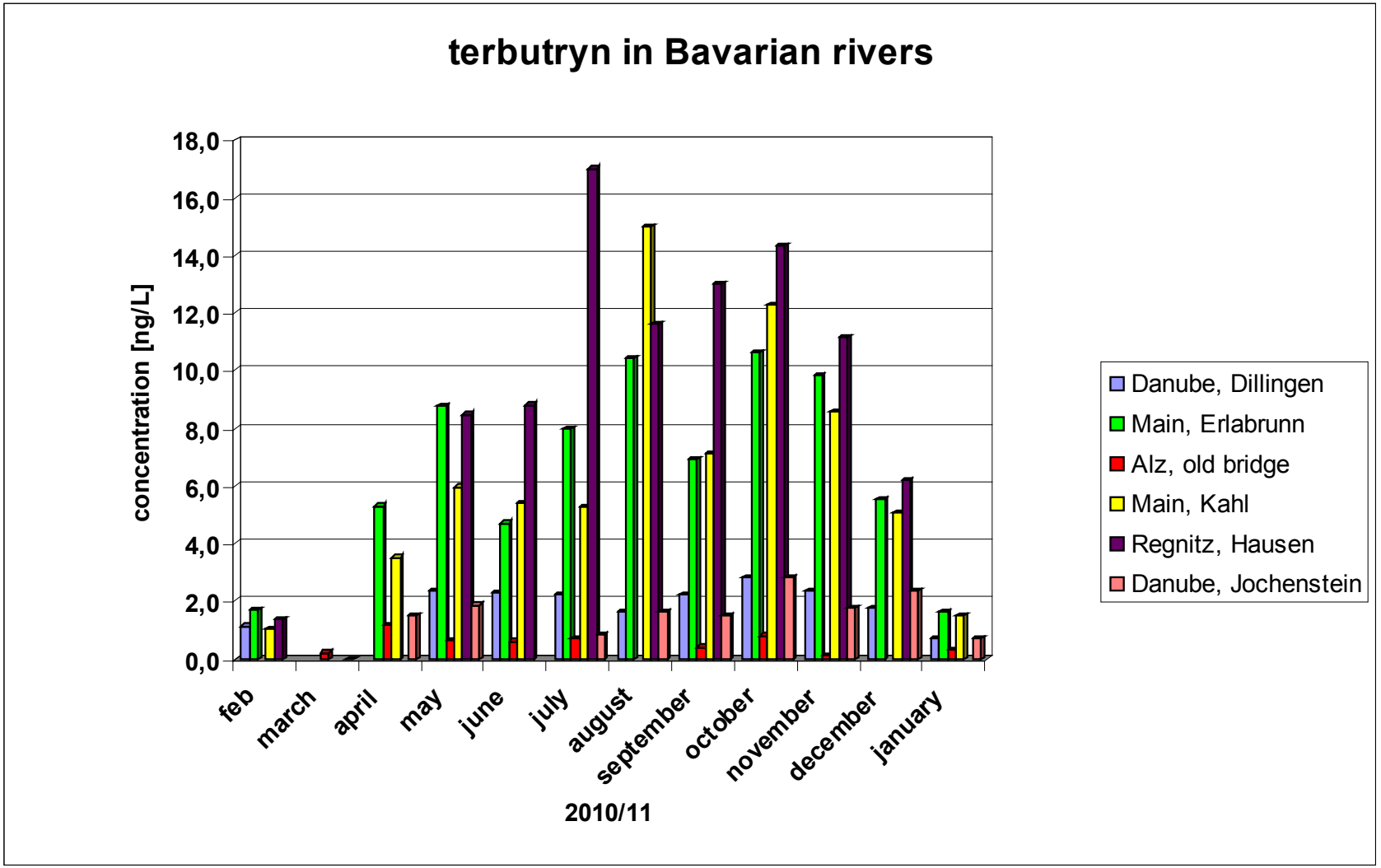
## Examples

- **Terbutryn** in surface waters (authorisation 1971-2002)

  1989-2012: 8438 data entries, 1336 positives, 147 values >0,1 µg/l, maximum: 106 µg/l

  **Carbendazim** in surface waters (authorisation since 1973)
- 2001-2012: 5898 data entries, 60 positives, maximum: 1,84 µg/l

# Terbutryn in surface waters



## Conclusion

- there is a lot of data for selected biocides, especially for biocides also used as pesticides
- most data are for waters – only few data for sediments, suspended solids or biota
- development of monitoring concepts should take into regard these existing monitoring data
- a proposal for biocide monitoring based on a clearly documented prioritisation process is really welcome to fill the data gaps

***Thank you for your attention***