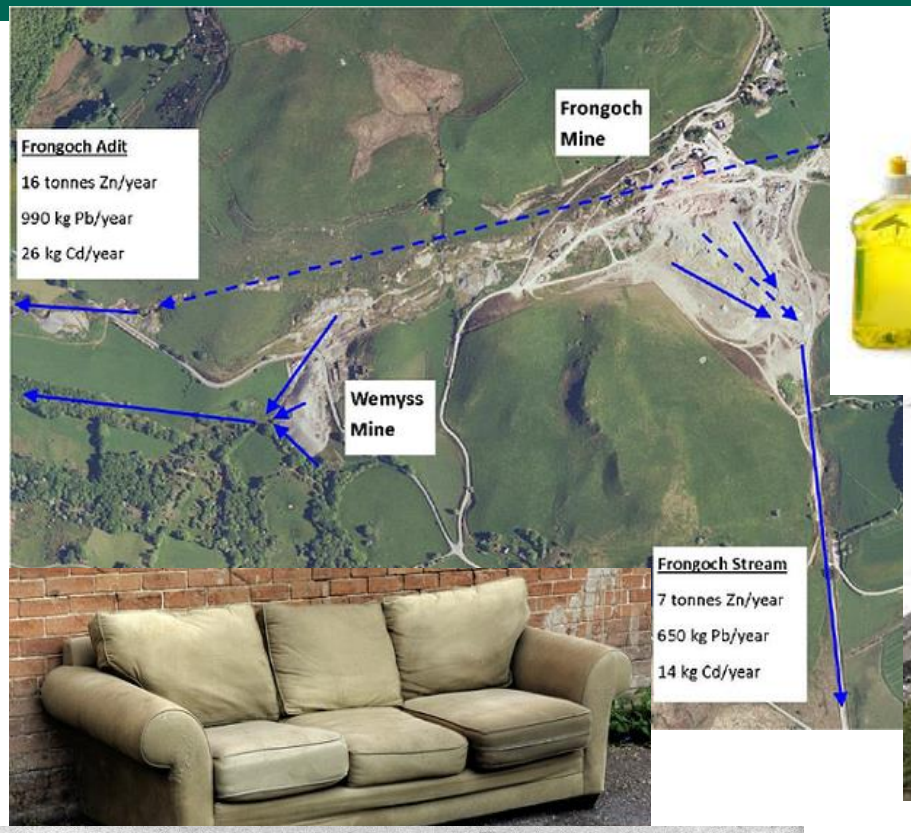
Caroline Whalley, Vit Kodes and Hana Prchalova
Eionet Freshwater meeting
19-20 June 2017

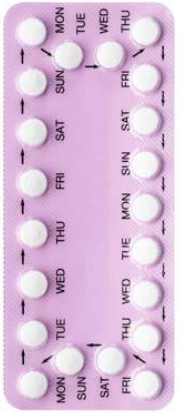
Chemical status and quantitative status – breakout presentation

Outline of this breakout session

- Overview of chemicals in WFD
  - River basin specific pollutants
  - Chemical status of surface waters – “Priority Substances”
  - Groundwater chemical status (Vit)
  - Discussion
- Groundwater quantitative status (Nihat)
  - Discussion
- Preparation for plenary

“Chemicals”…


Frongoch Adit
16 tonnes Zn/year
990 kg Pb/year
26 kg Cd/year
Frongoch Mine
Wemyss Mine
Frongoch Stream
7 tonnes Zn/year
650 kg Pb/year
14 kg Cd/year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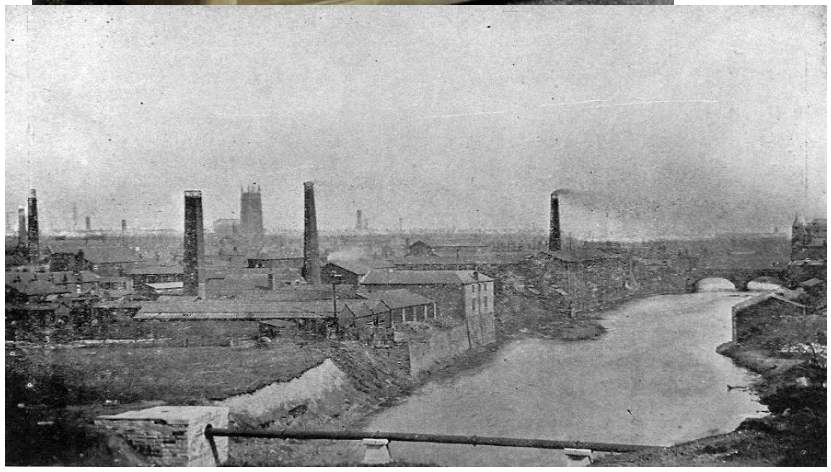


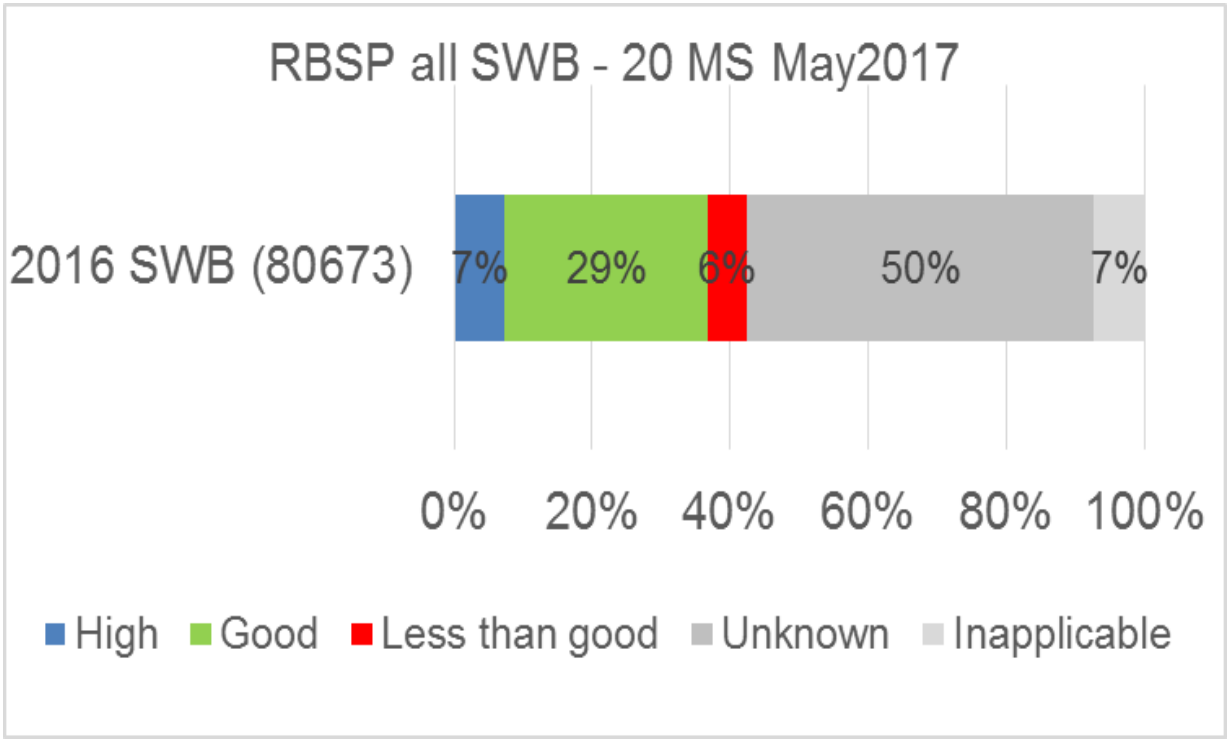
WFD and chemicals

- Precautionary principle; preventive approach; polluter should pay.
- Good Ecological Status for “river basin specific pollutants” (WFD Annex V, 1.1.1)
- Good Chemical Status – for “priority substances” in surface waters (WFD Art 16)
- Good Chemical Status for groundwater (WFD Art 17)

River Basin Specific Pollutants – under Ecological Status

- Substances discharged in significant quantities into the body of water
- Identified by Member States (MS)
- Environmental Quality Standards (EQS) set by MS, usually at national level but can be more local – poses challenges for intercomparability

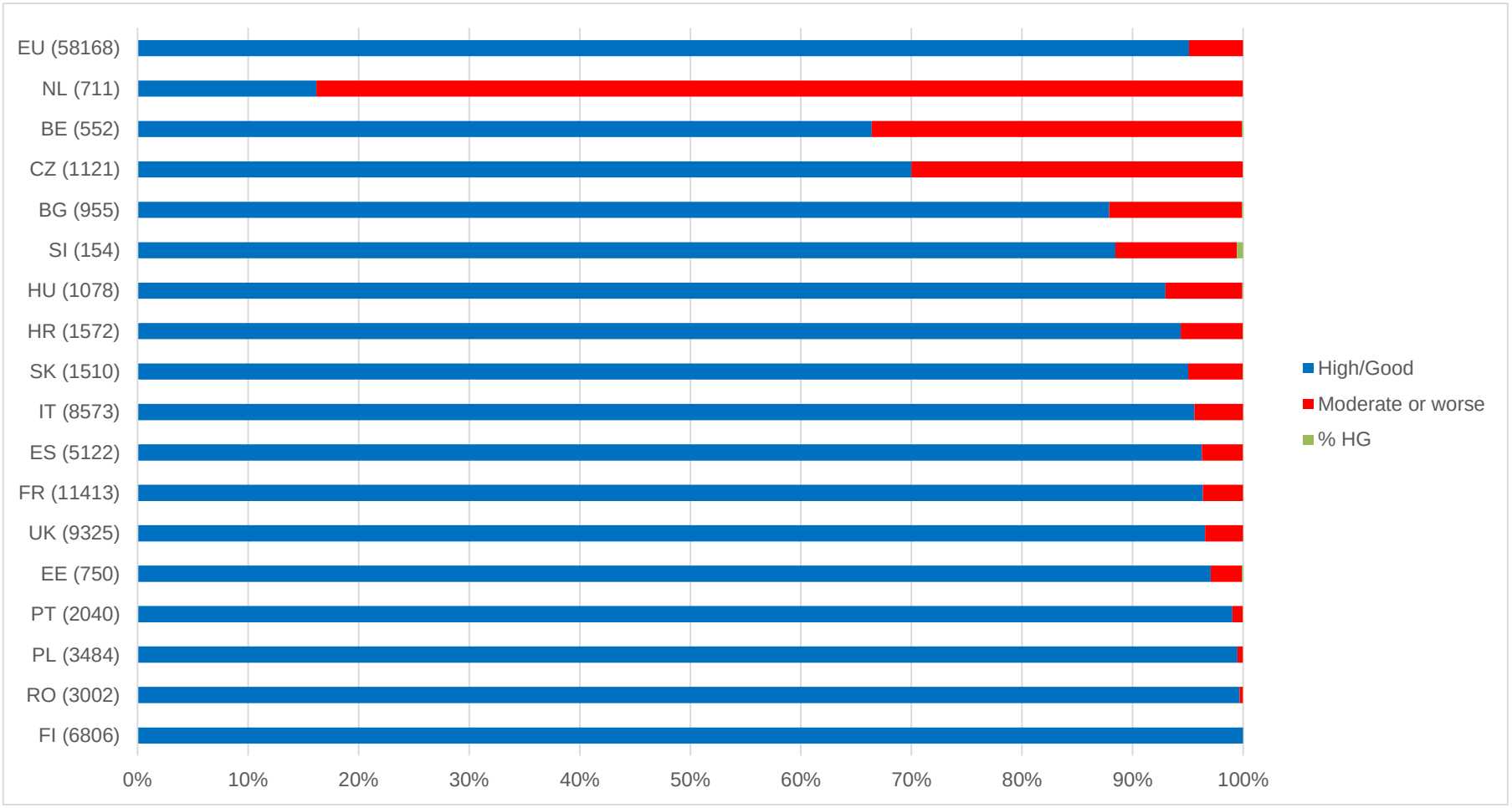
RBSPs overall status as percentage of all classified water bodies



Note: ecological status, using number of water bodies

Preliminary data May 2017

RBSPs – status by Member State



Preliminary data May 2017

European Environment Agency

RBSPs not achieving good ecological status – 20MS

Substance	No of categories	No of MS reporting `failures`	No of water bodies `failing`
Zinc	3	14	787
Copper	3	11	519
Cobalt	3	4	222
Arsenic	4	12	210
Selenium	3	4	206
Metolachlor	3	4	93
Chromium	4	8	89
Barium	2	4	59
MCPA	2	4	55
Total cyanide	1	4	49
Terbuthylazine	2	4	40
Boron	3	4	17
Fluoride	1	4	15

Preliminary results – May 2017

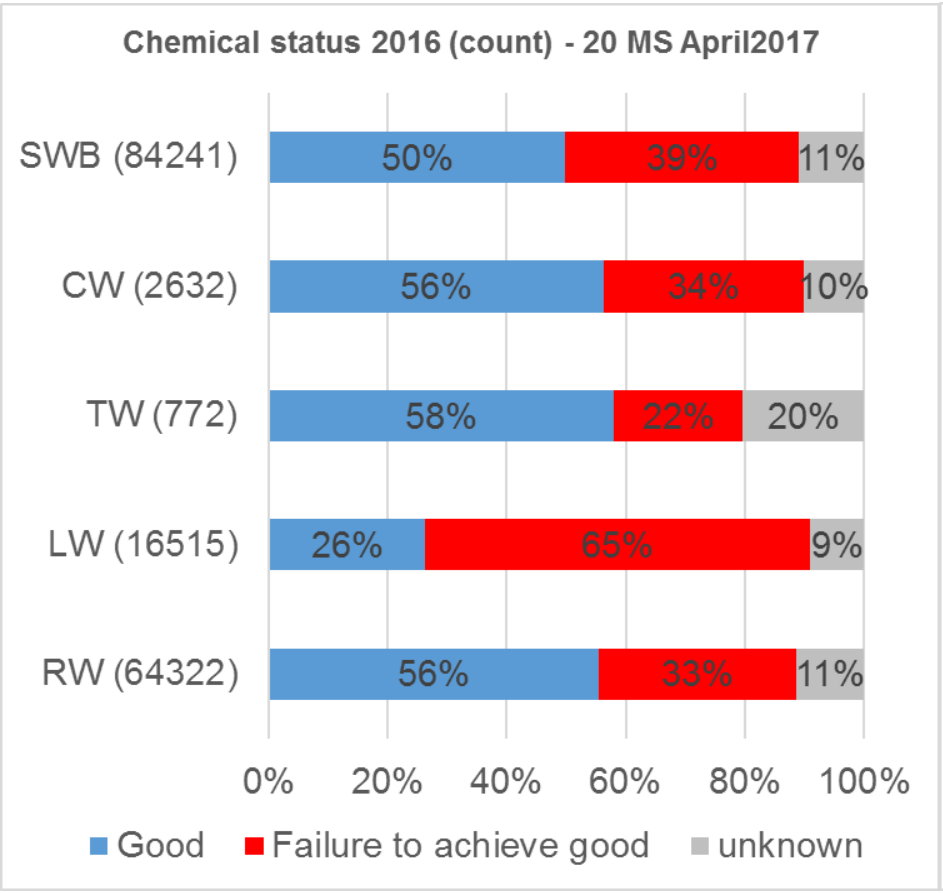
RBSPs – preliminary results

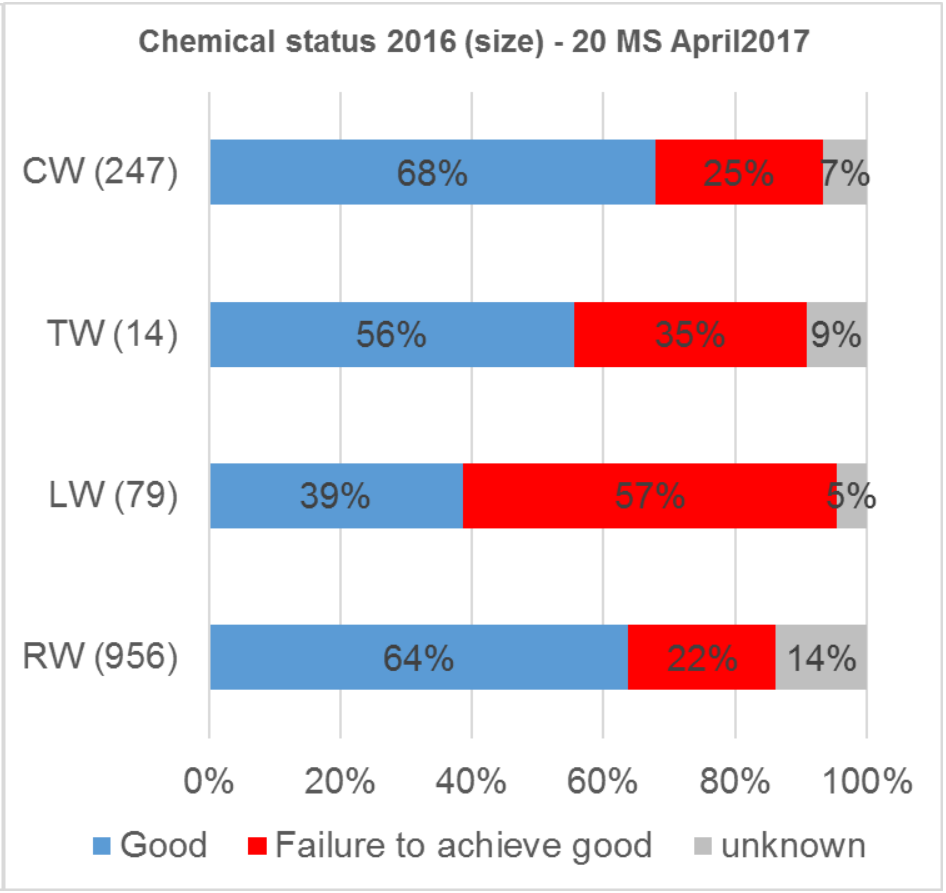
- At EU level, 5-6% water bodies not achieving good status owing to RBSPs.
- Where there was failure, most (>80%) owed to one or two substances.
- Most widely reported failing RBSPs are metals and pesticides.
- Several substances reported by only few MS, but are responsible for relatively high proportion (>30%) of water bodies failing good status in those MS

Priority Substances…

- “present a significant risk to or via the aquatic environment”
- Environmental Quality Standards apply across all Member States

Chemical status of SWBs by count of water bodies (left) – by size (right)





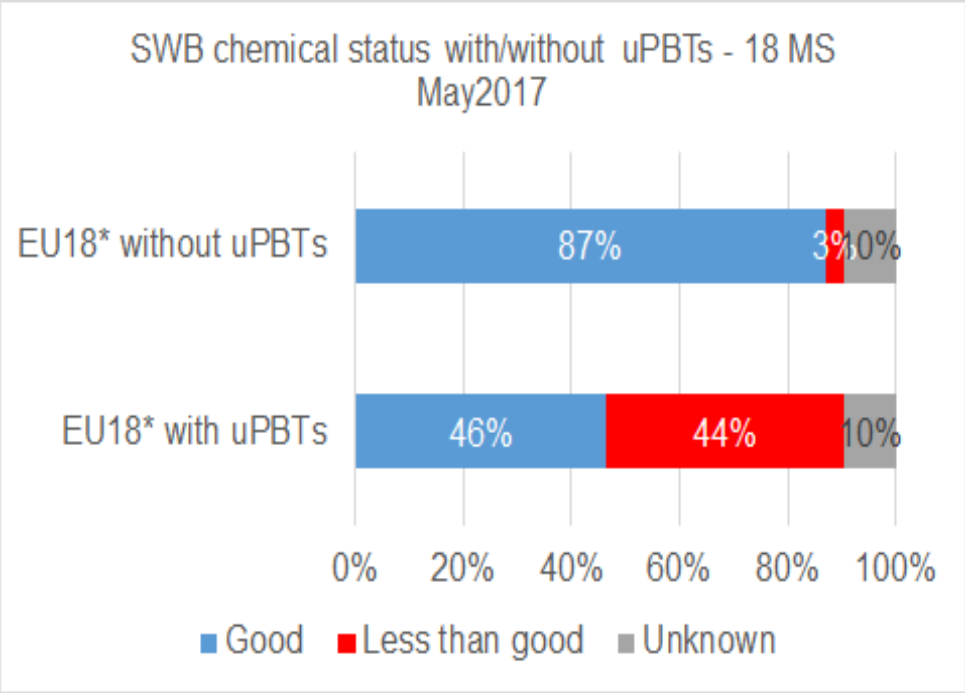
RW = rivers
LW = lakes
TW = transitional
CW = coastal

Preliminary results – 20 MSs – end-April 2017

European Environment Agency

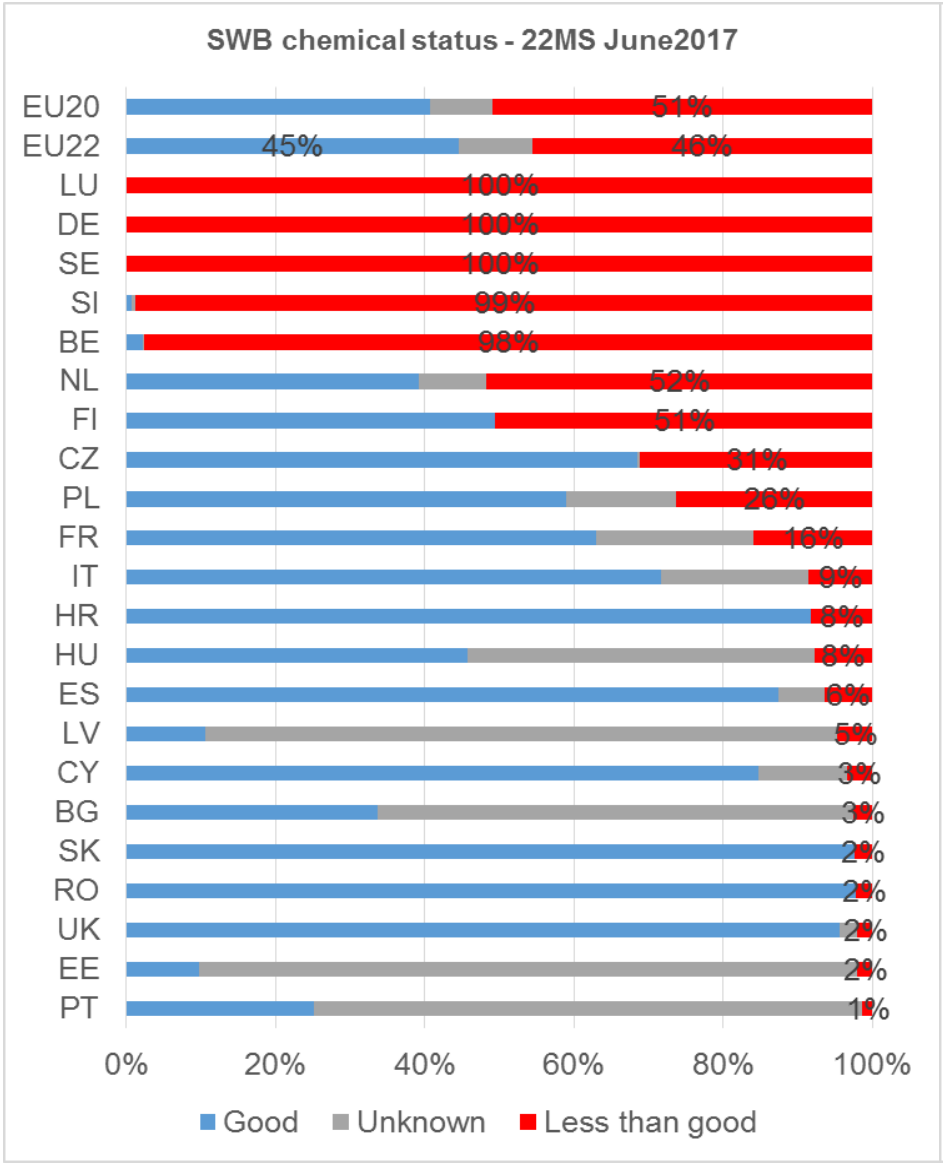
uPBTs – ubiquitous, Persistent, Bioaccumulative and Toxic

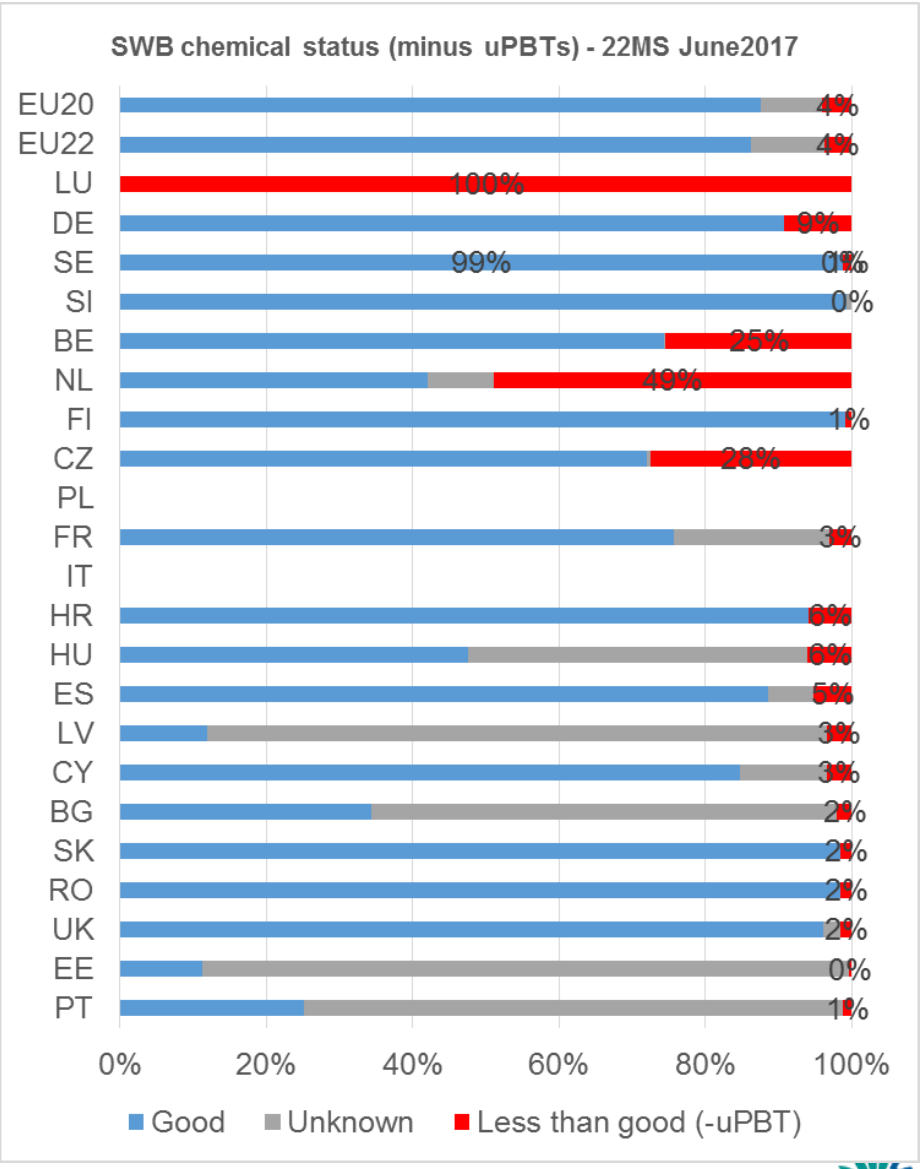
- Subset of priority substances identified in 2013 directive:
  - Brominated diphenylethers
  - Mercury
  - PAHs (benzo-(a)-pyrene etc)
  - Tributyltin
- Widespread pollutants for which significant measures have already been applied (eg use restrictions)



EU18* (EU20 – minus Poland and Italy – as not all SWBs in poor chemical status have information on priority substance causing failure)

Chemical status in MS – effect of uPBTs





Preliminary data June 2017: 22MS

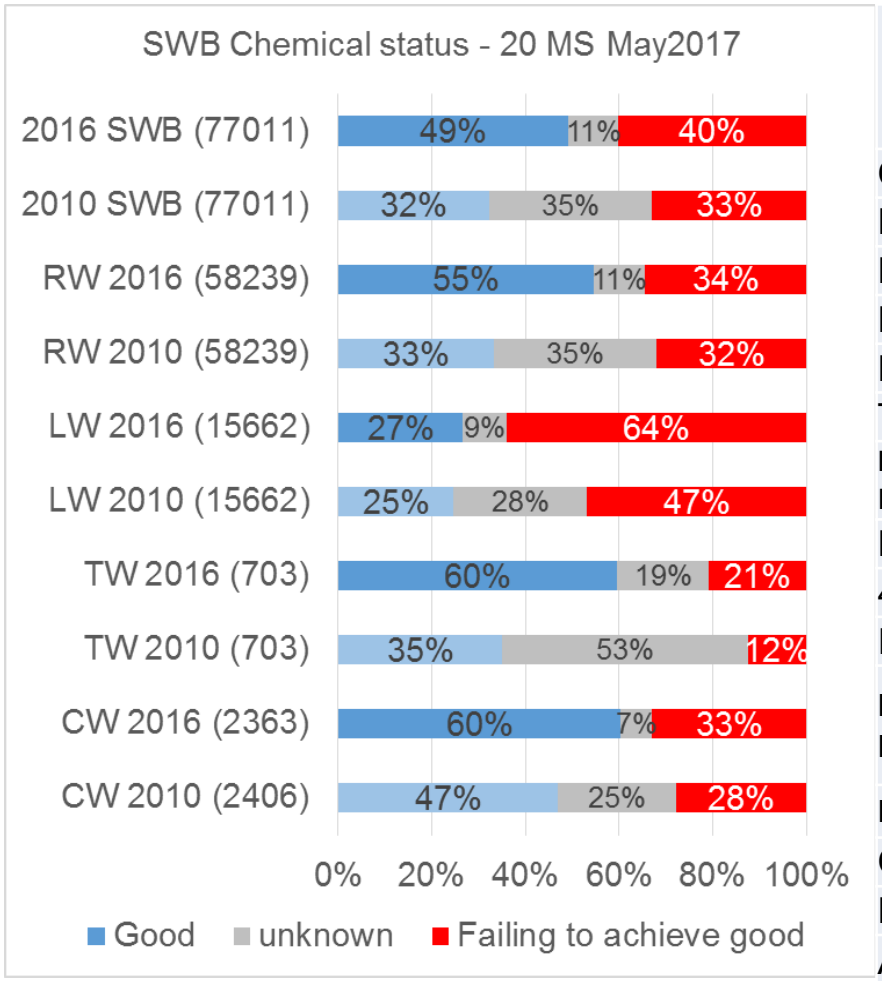
Priority substances causing failures

Priority substance (uPBT in **bold**)	"group"	No. waterbodies failing	No. Member States reporting failure	MS %age of total failures
Mercury	Metal	28305	19	SE (82%); FI (12%)
Brominated diphenylethers	Flame retardant	23263	7	SE (99.7%)
Benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene	PAH	2250	12	FR (64%)
Fluoranthene	PAH	788	12	NL (39%); CZ (32%)
Cadmium	Metal	716	18	--
Nickel	Metal	662	18	--
Lead	Metal	479	16	--
Tributyltin	Biocide	465	13	--
Benzo(a)pyrene	PAH	462	9	CZ (43%); NL (30%)
Benzo(b)fluor-anthene + Benzo(k)fluor-anthene	PAH	285	9	CZ (50%)
4-nonylphenol	Surfactant	177	8	FR (55%)
Isoproturon	Pesticide	125	5	FR (72%)

20MS, preliminary data.

Changes since RBMP 1

Change in chemical status by water category



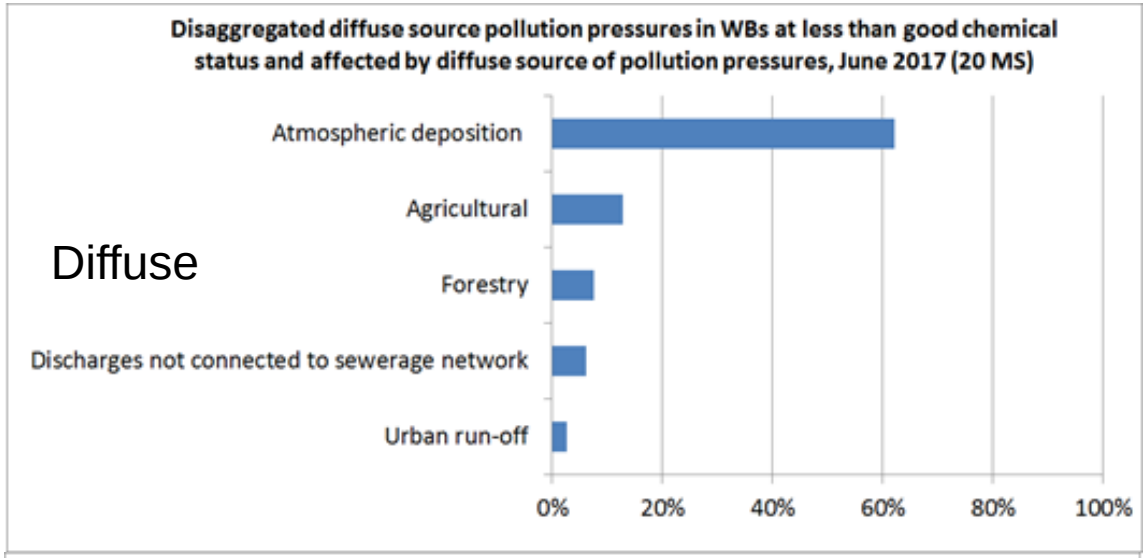
Improvement of a Priority substance

	No of WBs improved (2016)	No of WBs failing (2016)	No of MS
Cadmium	353	712	12
Lead	279	428	10
Mercury	270	28276	9
Nickel	201	554	9
DEHP	46	90	8
TBT	39	464	8
Benzo(g,h,i)perylene + Indeno(1,2,3-cd)pyrene	306	2219	7
Benzo(a)pyrene	59	447	7
4-nonylphenol	38	177	7
Isoproturon	103	125	6
Benzo(b)fluor-anthene + Benzo(k)fluor-anthene	87	272	6
Hexachlorocyclohexane	36	106	6
Chlorpyrifos	22	67	6
Fluoranthene	18	721	6
Alachlor	13	5	6

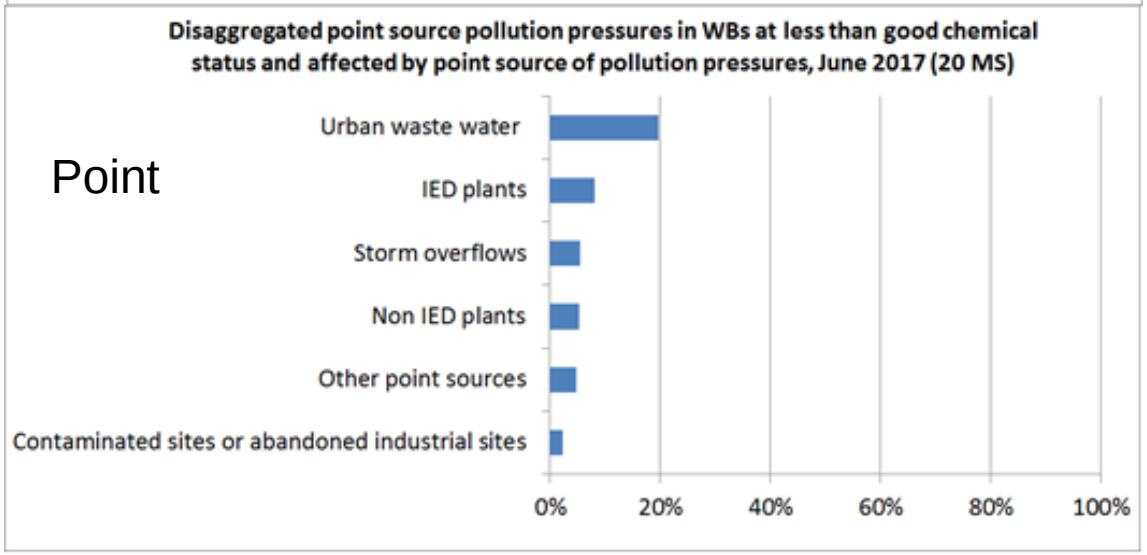
Preliminary data May 2017: 20MS

Diffuse and point chemical pressures on surface waters

Diffuse



Point



PLUS Priority substances
Inventory of emissions, discharges and losses to be used to inform

Preliminary data May 2017: 20MS

Main pressures – preliminary findings, May 2017

- Atmospheric deposition leads to contamination with mercury and BDEs in most water bodies failing good chemical status.
- Atmospheric emissions include those from combustion of fossil fuels (PAHs).
- Inputs from urban waste water treatment plants are less significant but lead to contamination with PAHs, mercury, cadmium, lead and nickel.

Discussion 1)

1. RBSPs and chemical status and pressures in surface water…

2. Plenary discussion to consider:

Priorities – Accuracy – Alternatives and gaps

Groundwater chemical status

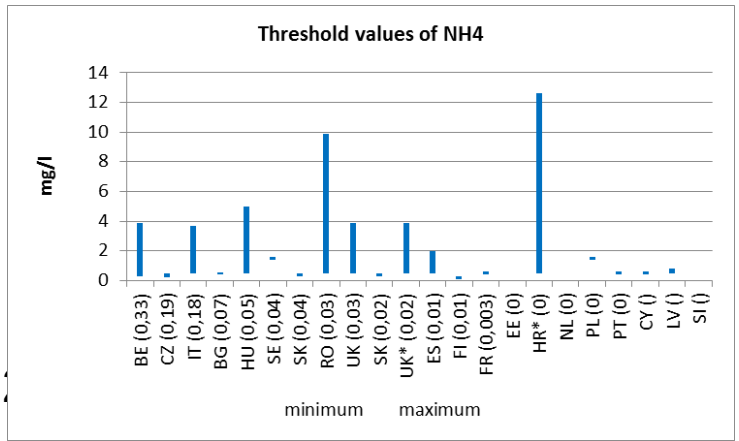
- Compliance with good chemical status criteria is based on:
  - EU standards of nitrates (50mg/l) and pesticides (0.1ug/l individual; max 0.5ug/l total), and
  - on threshold values established by MS.
- Provisions do not apply to high concentrations of naturally-occurring substances

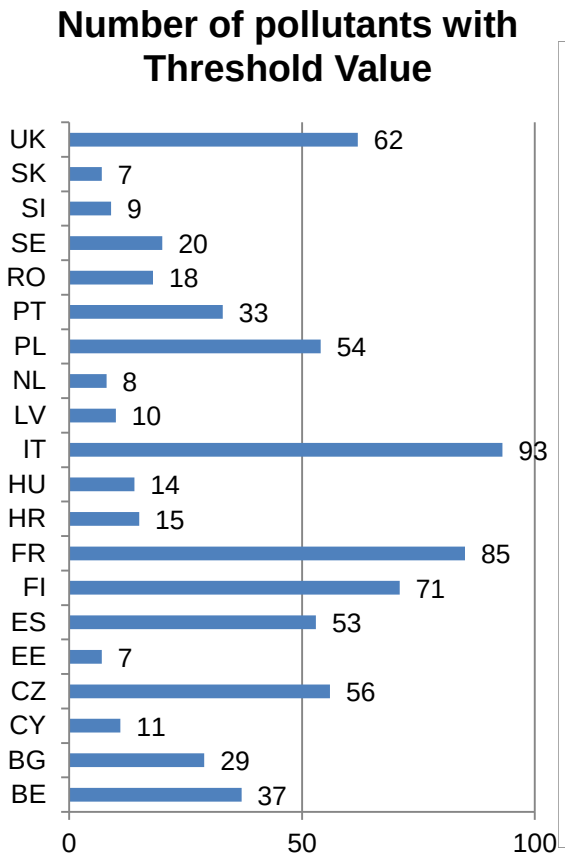
Threshold values for good chemical status (GW)

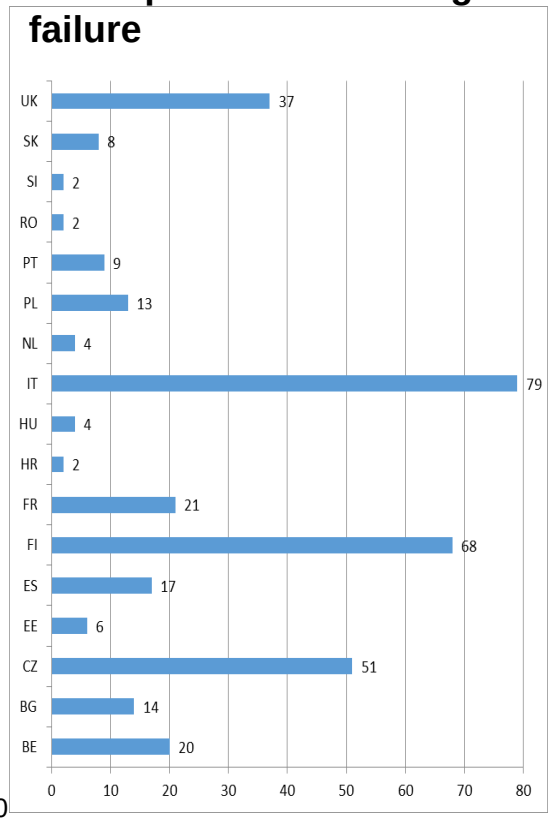
- Should consider impact on, and interrelationship with, associated surface waters and directly dependent terrestrial ecosystems and wetlands;
- Can be set at water body, river basin, national or international river basin level -– poses challenges for intercomparability

RBSPs and Groundwater Threshold Values

- Can be wide variation in EQS or Threshold Value for same substance – geochemistry might explain some of this.
- MS select what they view as appropriate – wide variation in numbers of substances included in assessment







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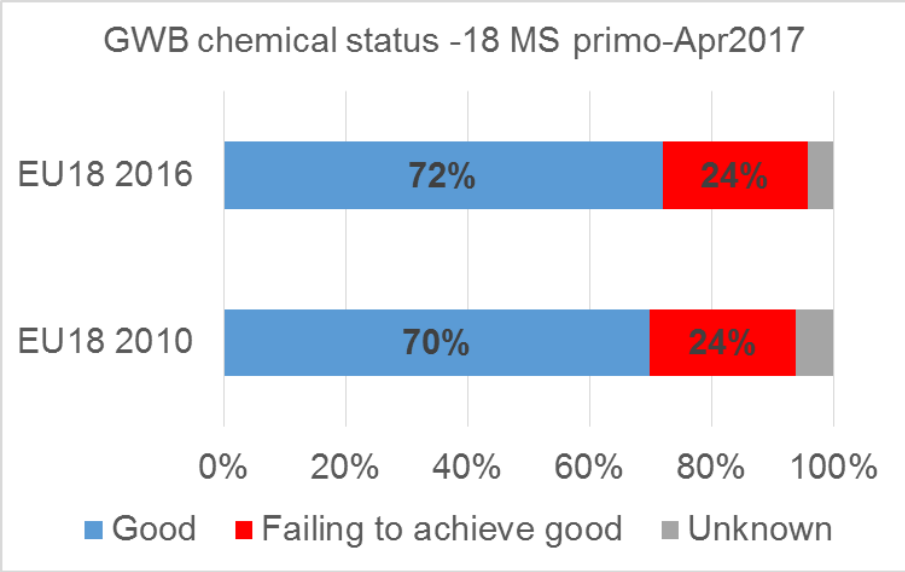
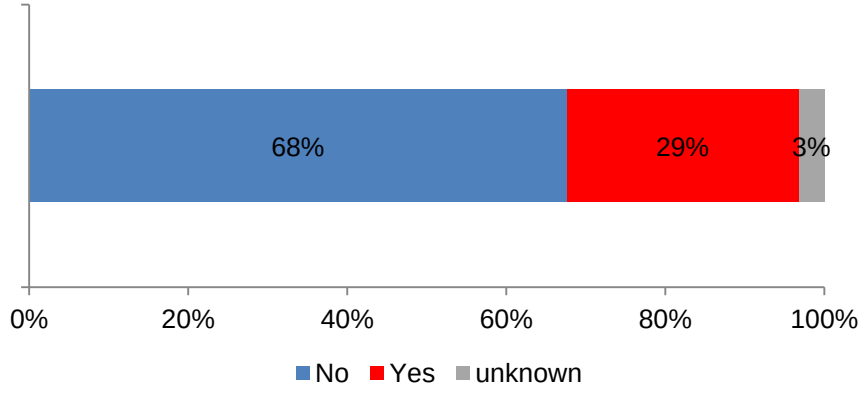
Groundwater chemical status



- Little change in GW chemical status between RBMP 1 and 2
- Owes partly to delays between measures and their effect

GWB Chemical at risk - 17 MS May 2017



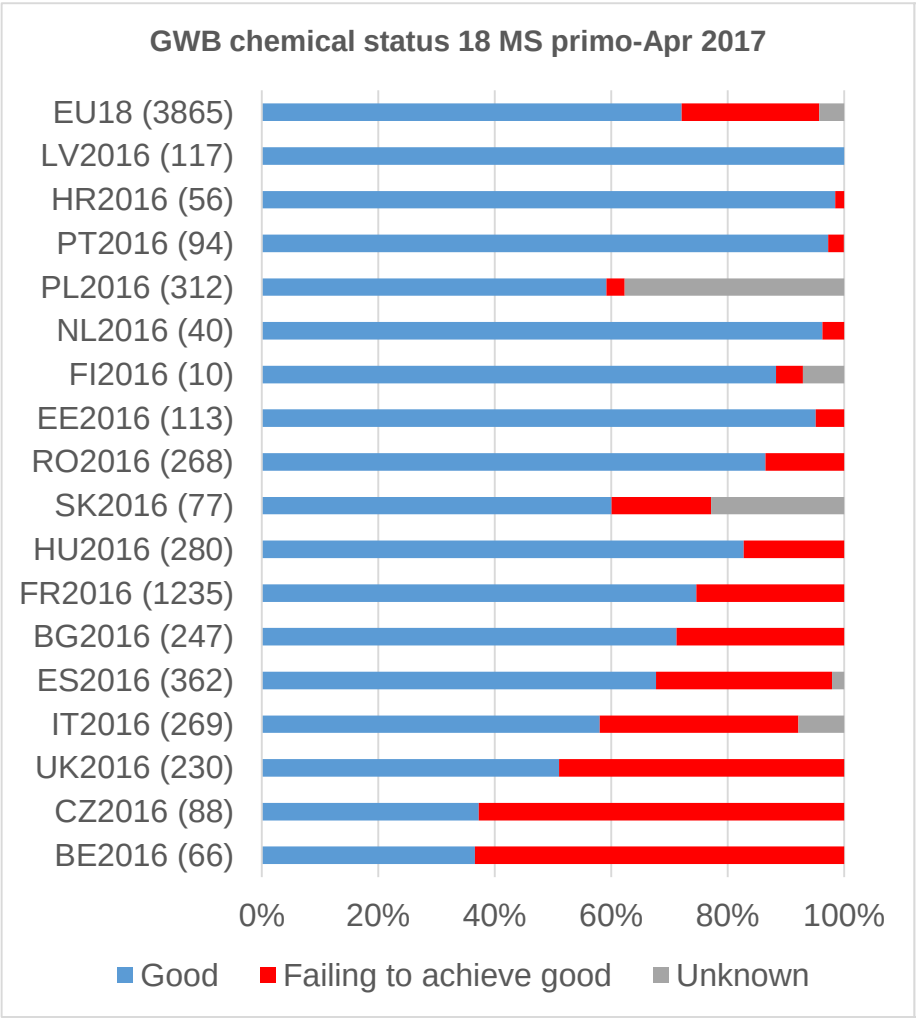
- Proportion of GWBs at risk is similar to GWBs failing to achieve good chemical status
- Assessment of risk aimed at measuring human activity to meet good chemical status and prevent the deterioration of good status.

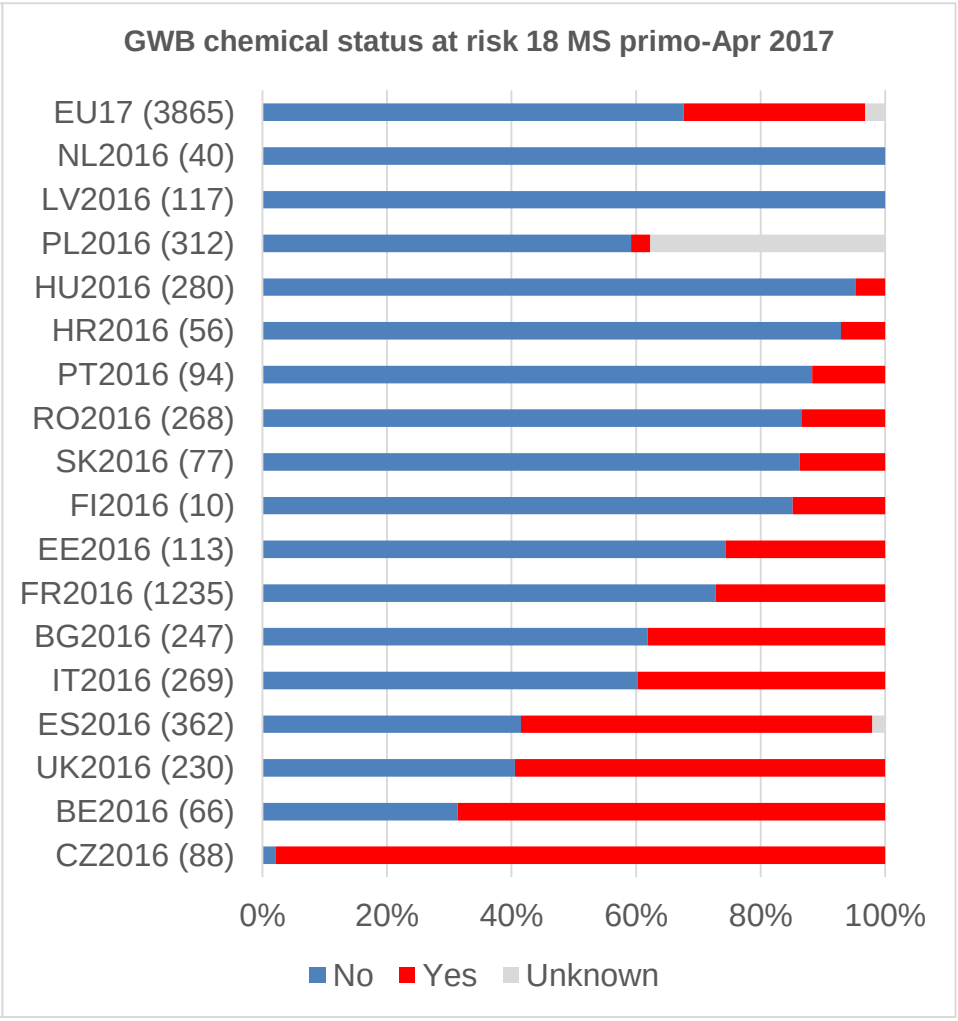
Preliminary results – 18 MS – April 2017

European Environment Agency

GW chemical status and at risk – sorted by MS

GW percentages by area





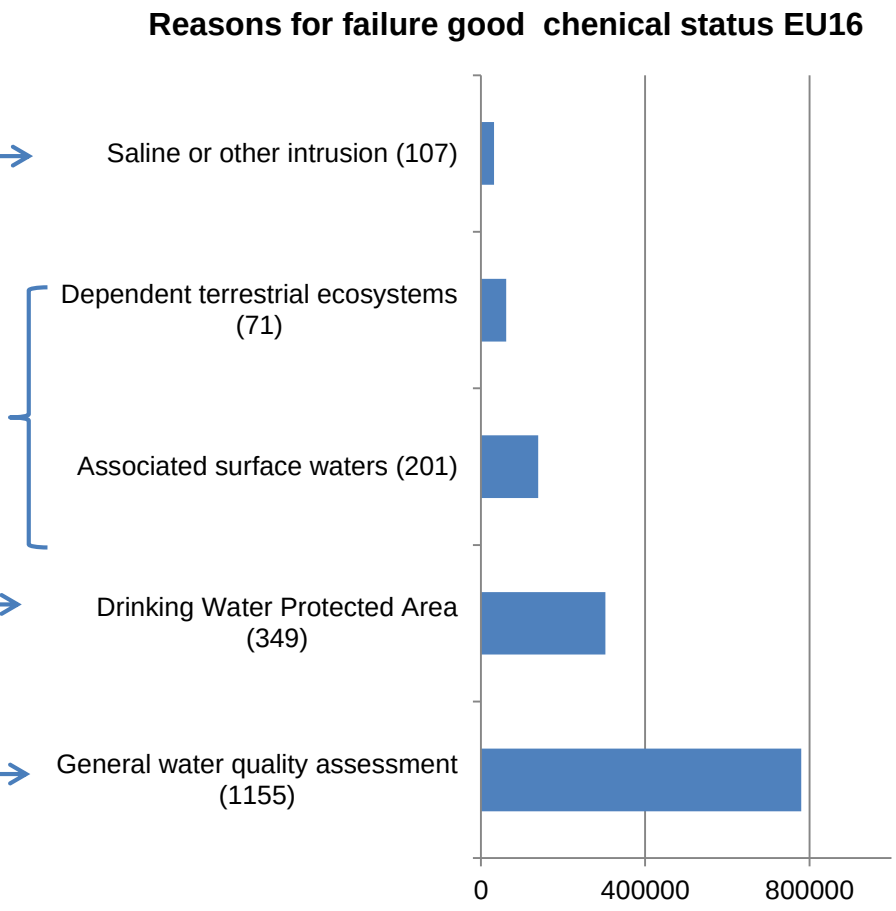
Preliminary data May 2017

European Environment Agency

Reasons for failure of GW chemical status

chemical status by area (number of GWBs in brackets)

- Saline and other intrusions
- Impacts on ecosystems
- Use
- General water quality (the concentration of pollutants exceeding the quality standards or TVs not considering impacts on ecosystems and uses of groundwater



EU16* (EU20 – minus Latvia (all groundwater bodies in good chemical status), Cyprus and Sweden (did not report data about groundwater chemical status) and Slovenia (did not report reasons)

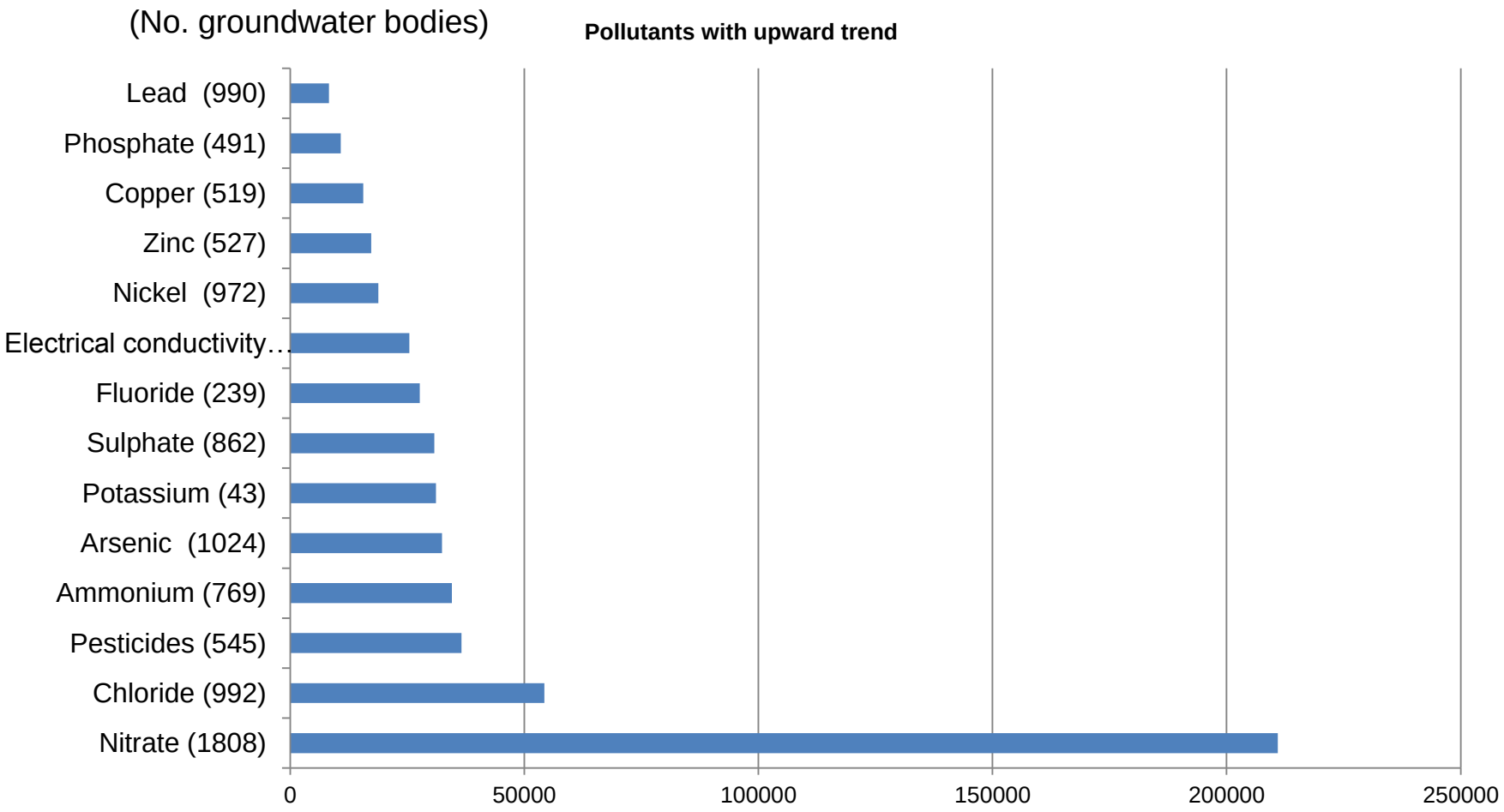
Preliminary data May 2017

Substances causing failure of GW chemical status (reported by over 4 MS)

Pollutant	Group	GWB area failing (km^2)	No. MS reporting substance failing
Nitrate	Inorganics	669254	17
Pesticides	Pesticides	259768	8
Ammonium	Inorganics	130307	10
Sulphate	Inorganics	94462	12
Chloride	Inorganics	81918	11
Nickel	Metals	72543	7
Arsenic	Metals	54301	7
Electrical conductivity	Inorganics	53936	8
Tetrachloroethylene	VOC	48330	8
Iron	Metals	33778	5
Trichloroethylene	VOC	31509	6
Benzo(a)pyrene	PAH	29471	5
Atrazine	Pesticides	19184	7
Mercury	Metals	8219	5

Preliminary data May 2017

Groundwater pollutants showing upward trend



Preliminary data May 2017

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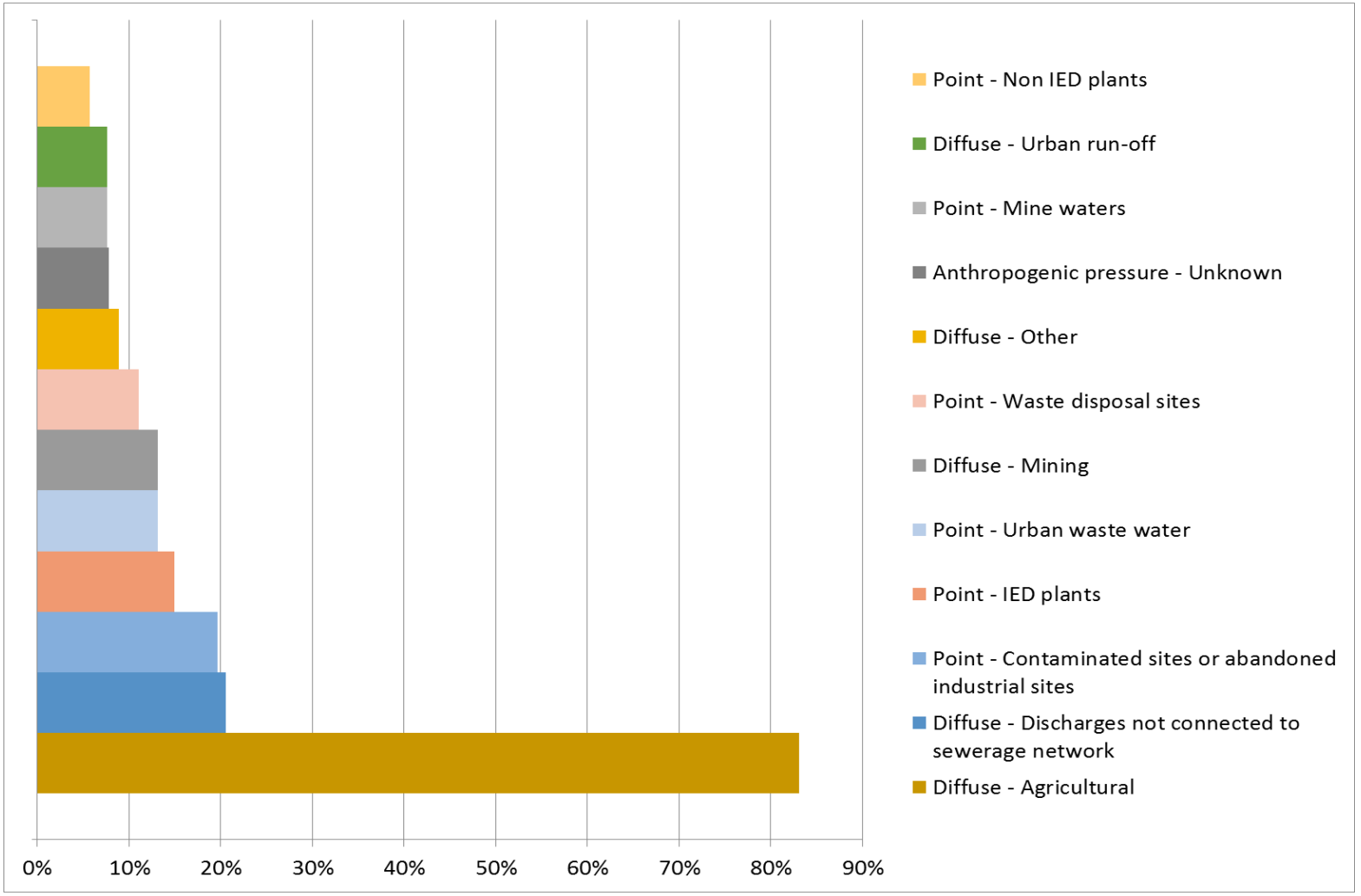
Main pressures causing failure of good chemical status



% of GWB area in poor chemical status
Shows where pressure causes >5% failure

Preliminary data May 2017, 20MS

European Environment Agency

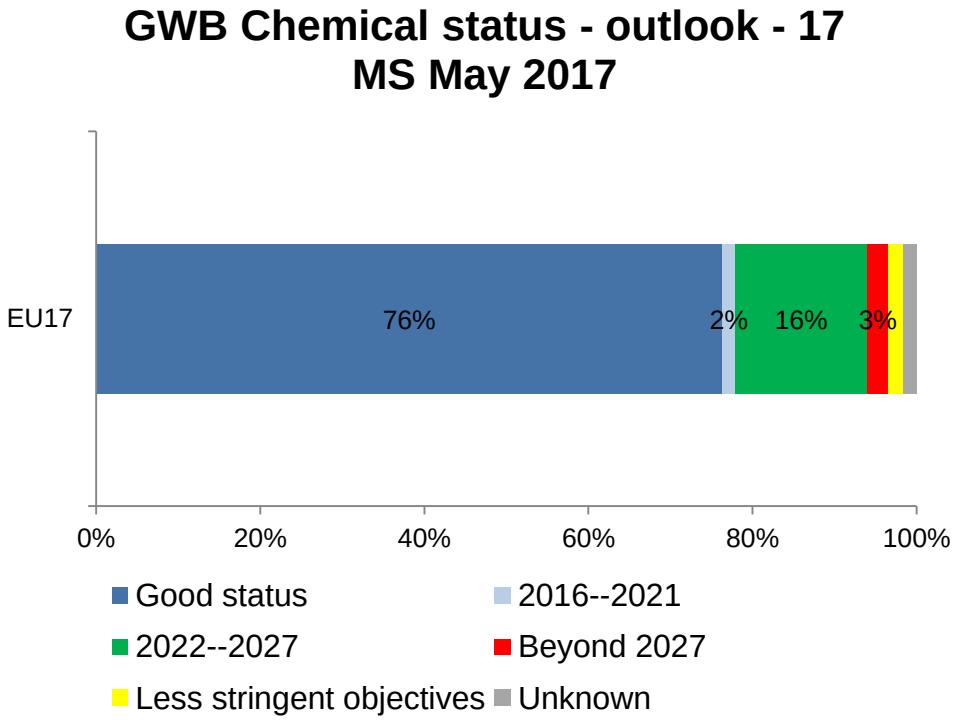
Groundwater pressures on chemical status

- Agriculture is the main pressure causing failure of chemical status to EU groundwaters, causing pollution by nitrates and pesticides (over 80% GW not achieving good chemical status).
- Other significant diffuse sources are from discharges not connected to a sewerage system (~20%).
- Main point source pollution pressures come from contaminated sites or abandoned industrial sites (~20%), discharges from IED installations and from urban waste water treatment (10-15%).

Preliminary data May 2017

Groundwater chemical status - outlook

- Expected achievement date reported for all GWBs failing to achieve good chemical status
- 2% of GWBs expected to meet good status by 2021; 16% by 2027.
- Small proportion of GWBs have already achieved less stringent objectives.
- Possible that some GWBs with achievement date beyond 2027 could be updated as GWBs with less stringent objectives in 2021.



Preliminary data May 2017

Looking across SW and GW chemicals

- Metals represent widespread source of failure to achieve good chemical status;
- In surface waters, BDEs and PAH are significant causes of failure, while in ground waters, nitrate and pesticides are responsible for most failures to achieve good status.
- Diffuse pollution is most the widespread chemical pressure on EU waters – atmospheric for surface waters, agriculture for groundwaters.
- Progress is being made tackling priority substances; however little improvement in overall chemical status for surface waters or groundwaters.

Discussion 2)

1. Groundwater chemical status and pressures…

2. Plenary discussion to consider:

Priorities – Accuracy – Alternatives and gaps