Towards harmonisation of monitoring hazardous substances

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Gulf of Finland, Road Map 2017

Pollution and Ecosystem Health

This presentation highlights:

Improved monitoring of hazardous substances

- **Assessment threshold values for hazardous substances and their effects should be harmonized**
  - **➔ enable harmonised status assessments**
- **A set of regional priority substances for the monitoring of both "old" and "emerging" substances is needed**

Other topics within monitoring:

- The methods used for the assessment of biological effects should be harmonised
- An expert group for the harmonisation and optimisation
- A joint open-access database for the available monitoring data

Other issues in Road Map

Reduced emissions of hazardous substances to air, land, and water

- More accurate emission inventories of hazardous substances
- Better technologies for hazardous substance removal

Targeted research on emerging problems; pharmaceuticals, microplastics

Dredging of contaminated sediments to be minimized and performed in an environmentally acceptable manner

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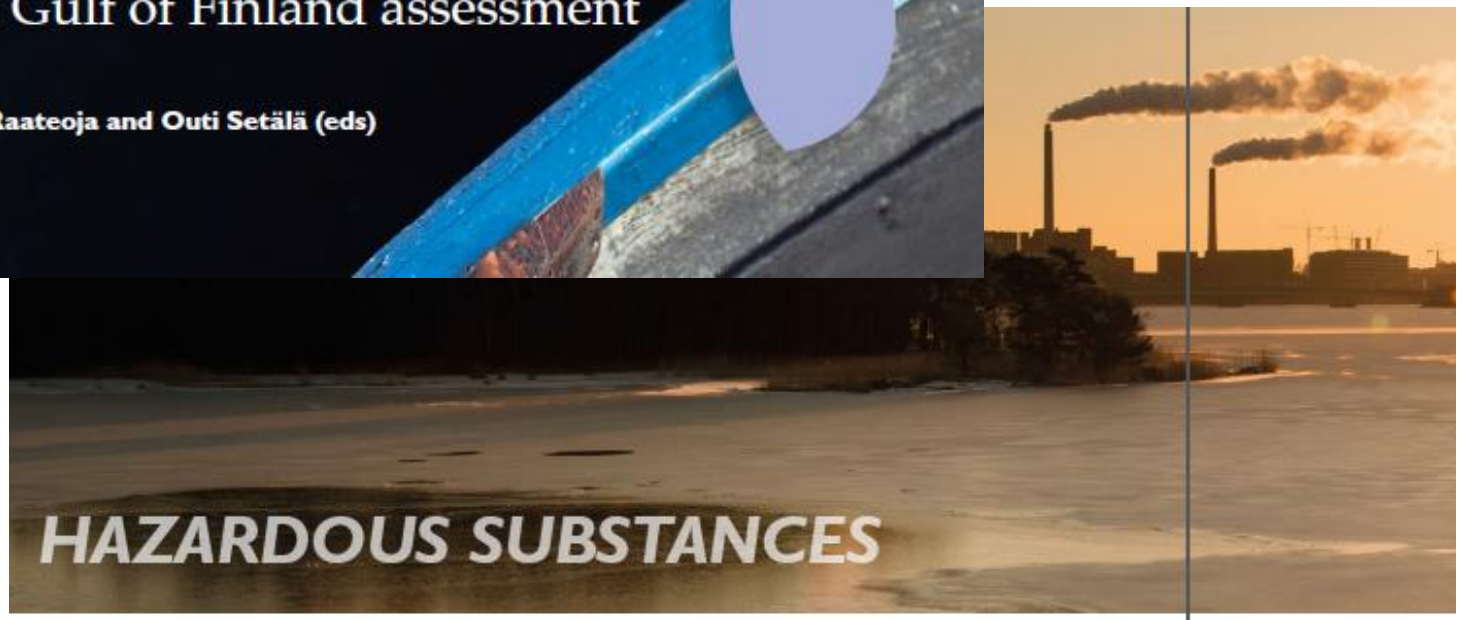
Published results 2016



Hazardous substances

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HAZARDOUS SUBSTANCE C

STATE OF THE BALTIC SEA
- HOLISTIC ASSESSMENT -
First version 2017

THE INTEGRATED ASSESSMENT OF HAZARDOUS SUBSTANCES

TO BE UPDATED IN 2018

-Supplementary Report to the First Version of the 'State of the Baltic Sea' Report 2017

HELCOM INDICATORS

Browse the HELCOM hazardous substance core indicators

- **Brominated diphenyl ethers (PBDE)**
- **Perfluoroalkyl substances (PFOS, other PFAS)**
- **Dioxins (PCDD/F) and dl-PCB**
- **Trace metals (Hg, Cd, Pb)**

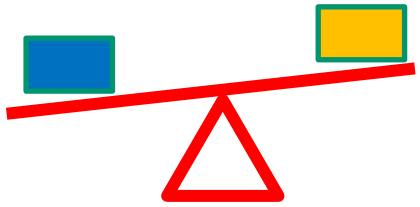
Risk for "bad status"

- **Hexabromocyclododecane (HBCDD)**
- **TBT and imposex**
- **PAHs and their metabolites**
- **Radioactive substances (Cs-137)**

Not assessed in this presentation

Risk based prioritisation and assessment

EXPOSURE ASSESSMENT
- Subst. usage & pattern
- emissions
- persistence
- accumulation
- mobility



EFFECTS ASSESSMENT
Toxicity to biota:
- ”traditional effects”
- endocrine effects
- Other adverse effects (?)

measured conc.
threshold

RELATIVE RISK = Are the concentrations higher than the treshold value ?

Hazardous Substances Indicators

HELCOM "CORE" and Finnish indicators (perch and herring)	EQS, QS or GES boundary in BIOTA
	µg/kg wet wt.
PBDE	EQS 0,0085 < QS 44
PCDD/F + dl-PCB	EQS 0,0065 TEQ > QS 0,0012
PFOS HBCDD	EQS 9,1 < QS 33 167
Organochlorine pesticides PCB	10 (HCB), 55 (HCBD) not CORE 75 (not CORE)
Mercury	20 (*Finland 20+180 backgr.*) (food 500, EFSA)
Radioactivity Cs-137) (fish, sedim, water	2.5 Bq/kg (fish) 1640 Bq/m2 (sedim) 14.6 Bq/m3 (water)

EQS based on human health protection

EQS based on secondary poisoning of predators

- Black = WFD substances with EQS in biota

Haz Subst indicators cont.

Indicators	EQS, QS or GES Boundary in BIOTA	EQS or GES *In WATER*	STATUS
I	µg/kg wet wt.	µg/l	
Cadmium Cd **Lead Pb** **Nickel Ni** **Arsenic As**	160 (in food 50) 120 mg/kg (sedim) (in food 300) In food 500-1000	EQS 0,2 EQS 7,2 (bioavailable 1,3) 20 (bioavail. 4,0)	CORE CORE not HELCOM indic not HELCOM indic
TBT **TBT, TPhT, DBT, DOT**	2 (TBT in sedim)	0,0002	CORE secondary GES
LMS biomarker (perch liver)	10 min.		Pre-core
PAH-substances	5 (BaP) molluscs		CORE
Algal toxins (fish, plankton, water)	800 (food, neurotox)	1 (WHO, liver tox)	National indicator

- **Black = WFD substances with EQS in water (except PAH)**

Contaminants in fish in Finnish coastal/open sea areas 2010-2016

New results:

UUPRI

HBCD

HCBD

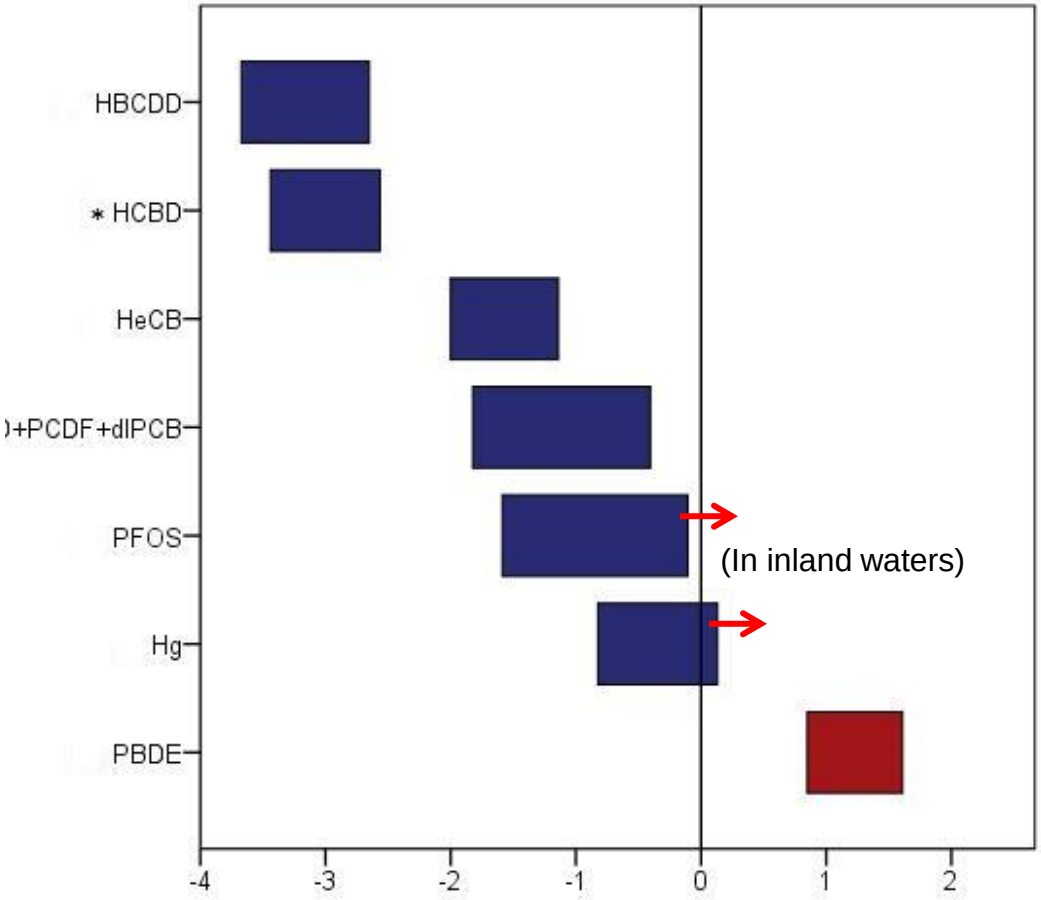
HCB

Diox +dl-PCB

PFOS

Hg

PBDE



- **perch + herring muscle**
- **Contaminant risk ratio (measured conc. in fish / HELCOM treshold)**
- **(10 ja 90 percentile, logarithmic scale)**
- **Red bar: average conc. >HELCOM treshold**

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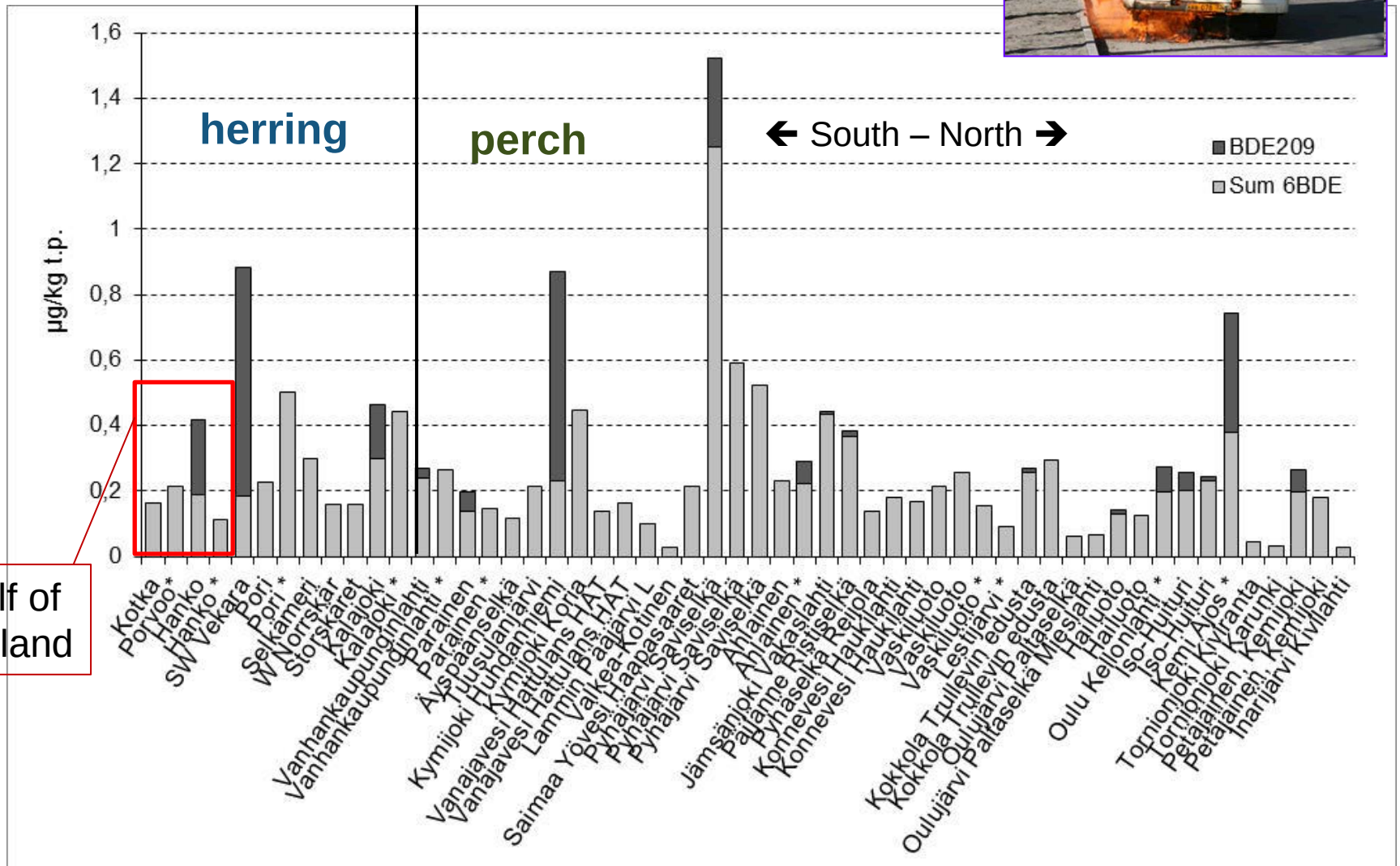
PBDEs in fish in Finland 2010-2016

- PBDE; Brominated flame retardant

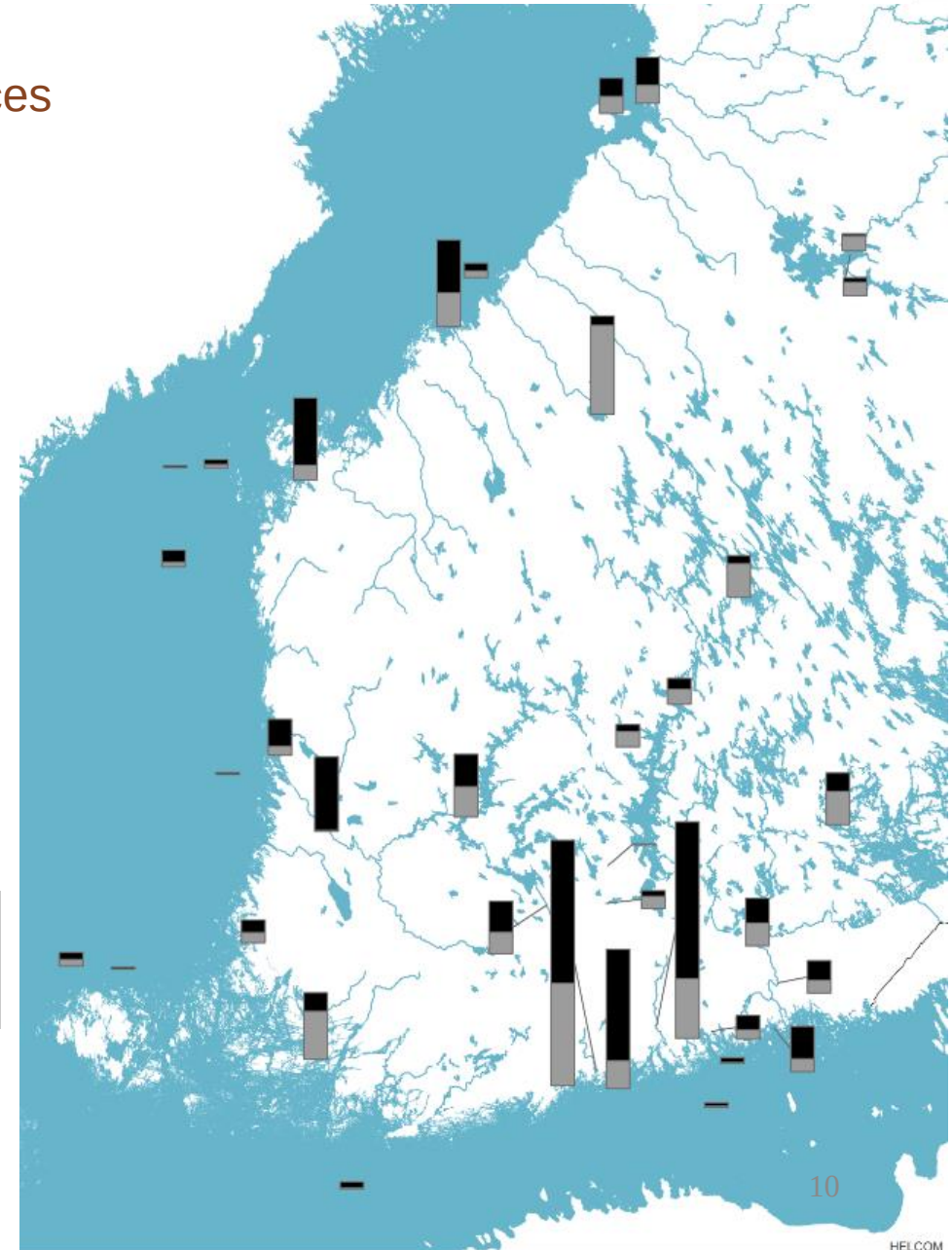


PFAS in perch and herring muscle (2012 – 2016)

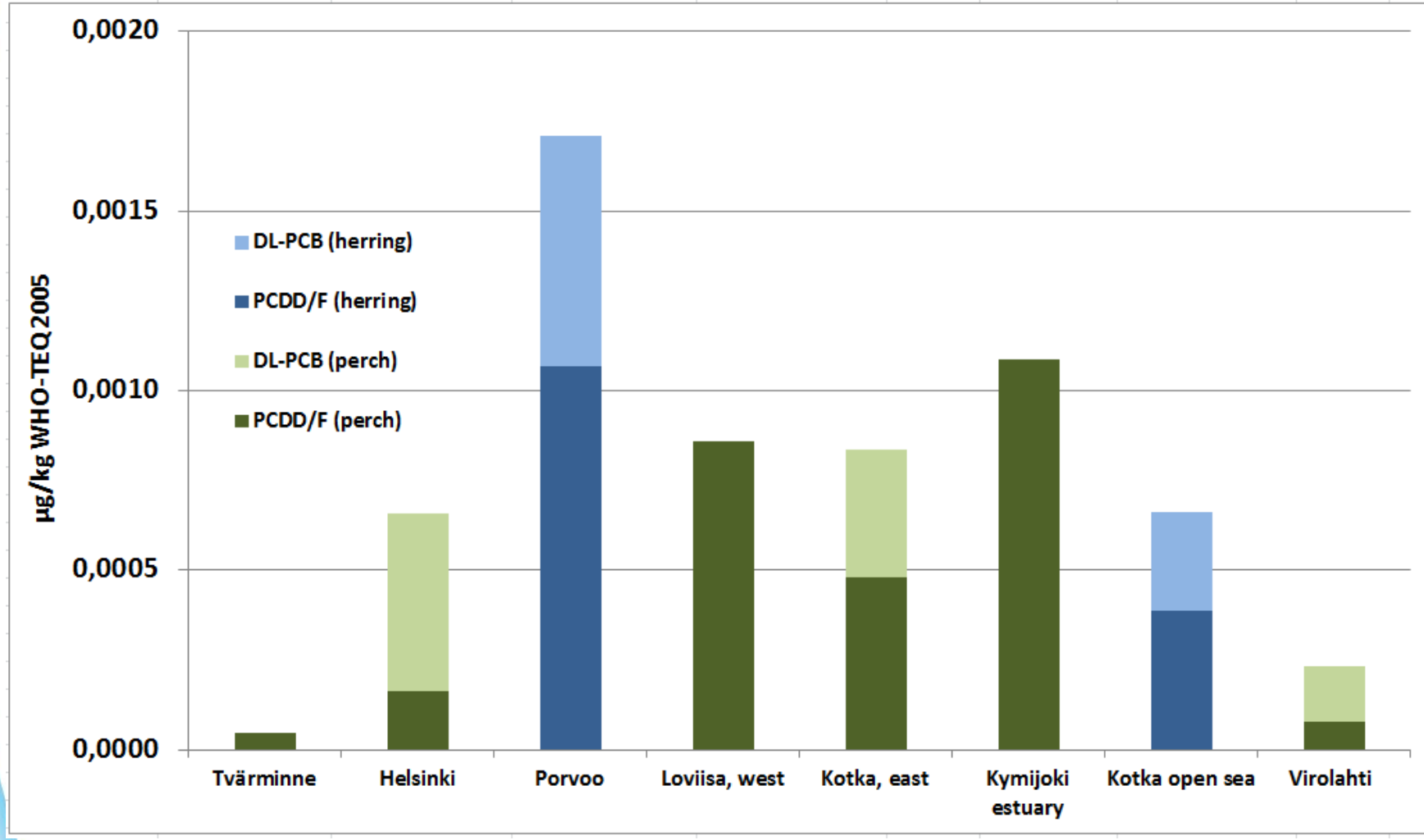
- Perfluorinated, surface active substances
  - Fire fighting foams
  - Textiles
  - Coatings, etc.

PFOS treshold (9,1 µg/kg)
- exceeded in some sites

No threshold for other PFAS



Dioxins in perch and herring muscle, Gulf of Finland (2012 – 2016)



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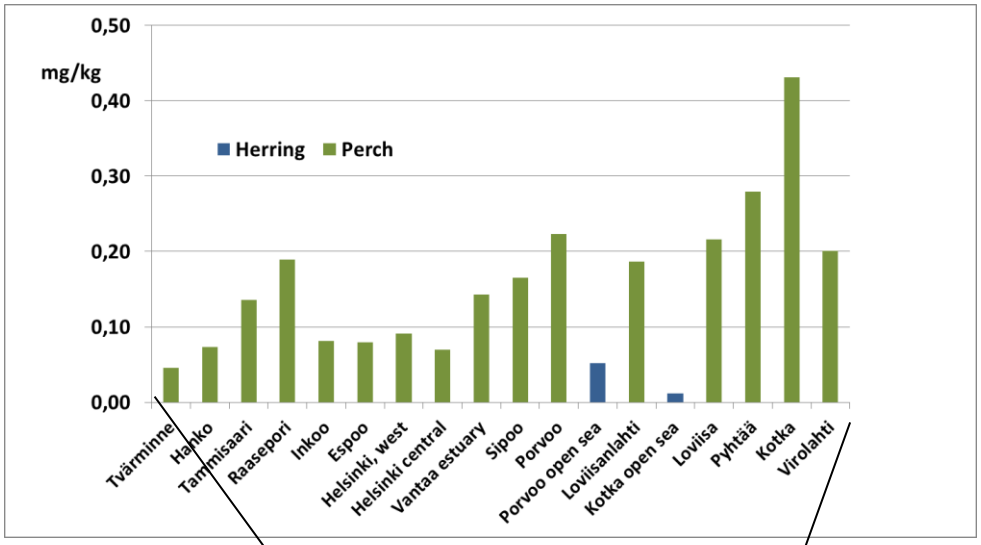
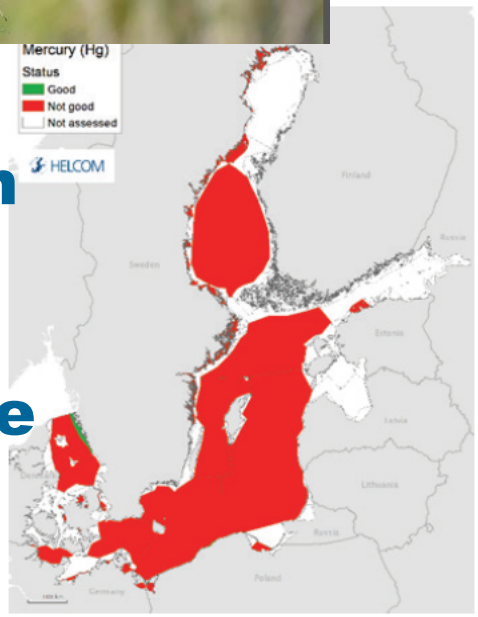


Mercury in fish is above HELCOM threshold value



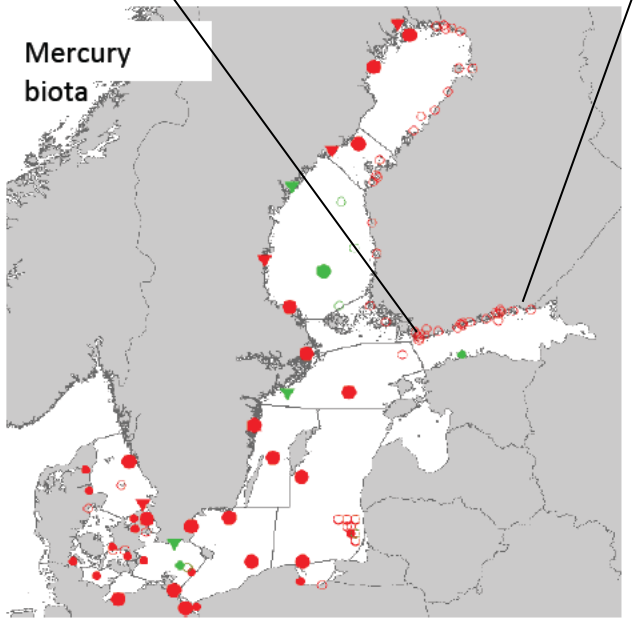


Figure 14. Assessment result for mercury (left) and underlying status calculated per station for the fish muscle (right). Small open circles indicate 'initial status assessment' data (only 1-2 years of data), small filled circles indicate that there is not enough data to assess a trend, large filled circles that concentrations have been stable during the whole monitoring period and the filled arrow that there is an upward or downward trend during the monitoring period, pointing in the direction of the arrow.

TBT concentration in surface sediment is decreasing

– but still exceeding the threshold value

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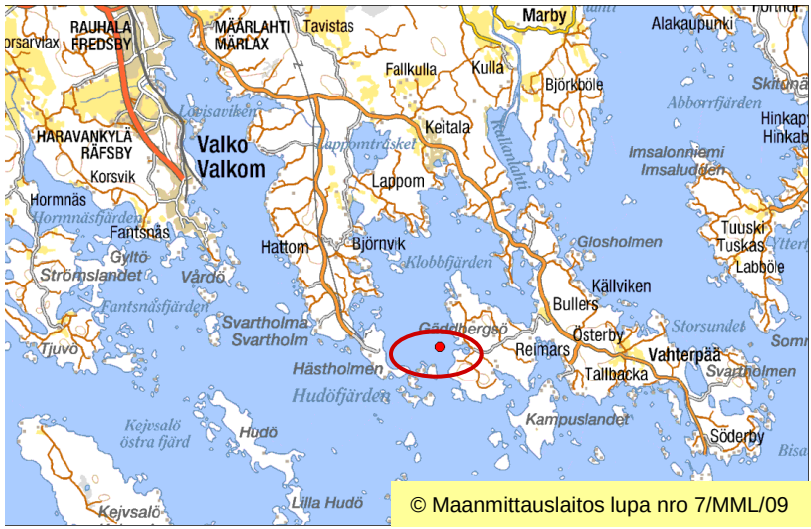

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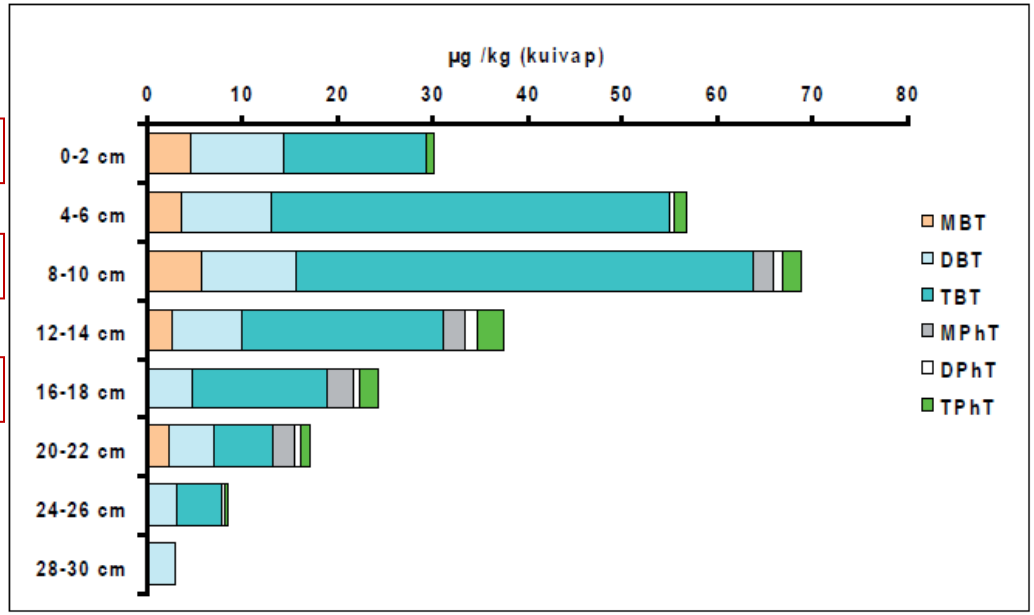

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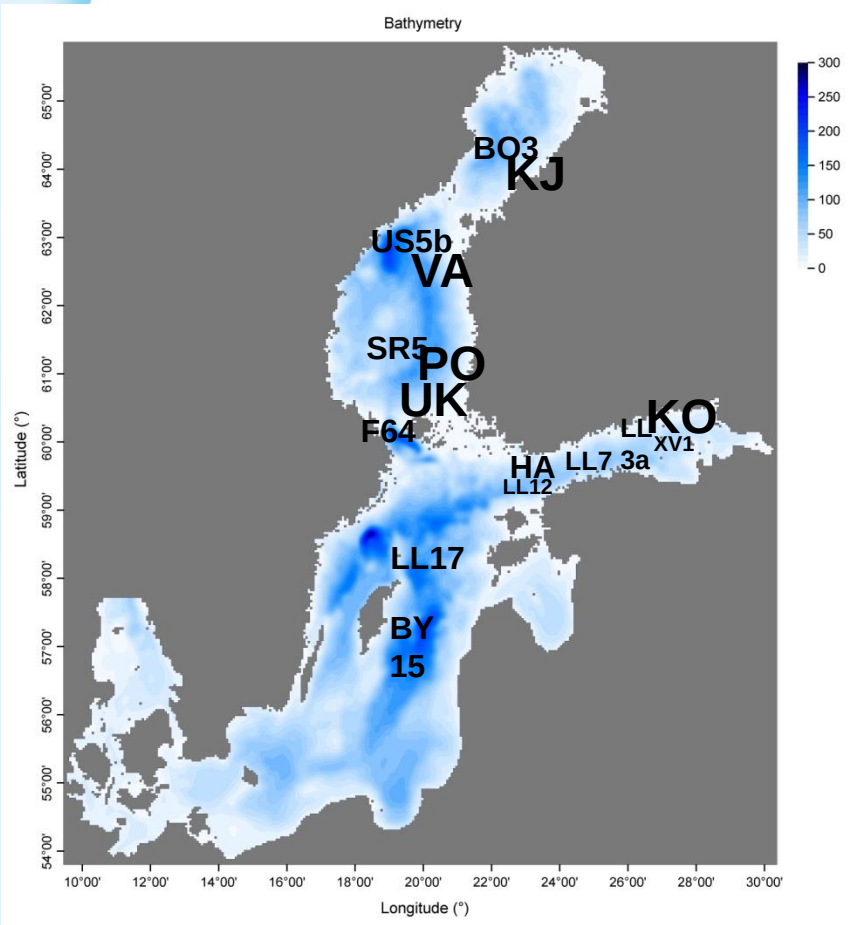
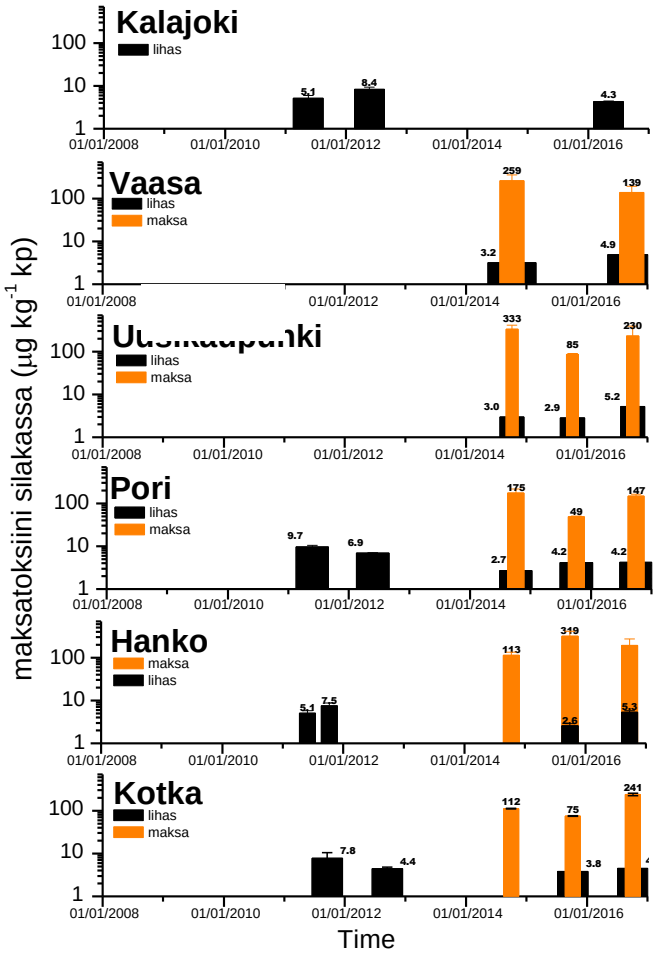
Example of National Indicator: hepatotoxins 2009-2016



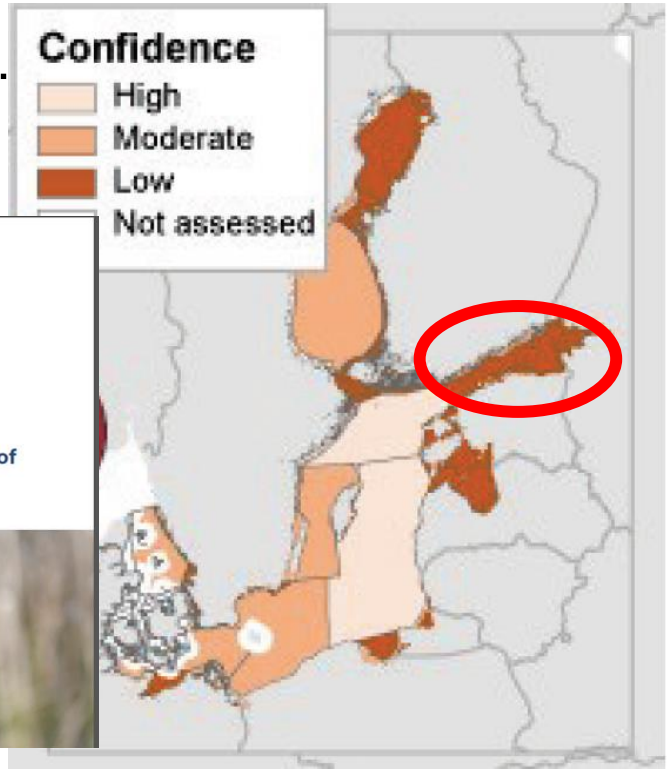
Herring:
Muscle ~ 3 – 10 µg/kg
Liver ~ 50 – 300 µg/kg



Conclusions

- **Threshold values do exist!**
  - For all BSAP Hazardous Substances and their indicators
  - Mostly for fish (biota), few for sediments, some for water

- **Gulf of Finland data lacking!**
  - Compared to other Baltic Sea regions
  - …ICES database not easy for uploading…
  - ➔ With too little data, **confidence is low**



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I DEFINE THE GOOD ENVIRONMENTAL STATUS!

10.10.2017

And we!

We also ?!

Thank you

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