

The German Environmental Specimen Bank: **Monitoring in the Wadden Sea Area**

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German ESB

IMPLEMENTATION

- In 1985 under the general responsibility of the Federal Ministry of Environment Nature Conservation and Nuclear Safety and the administrative coordination of the Federal Environmental Agency

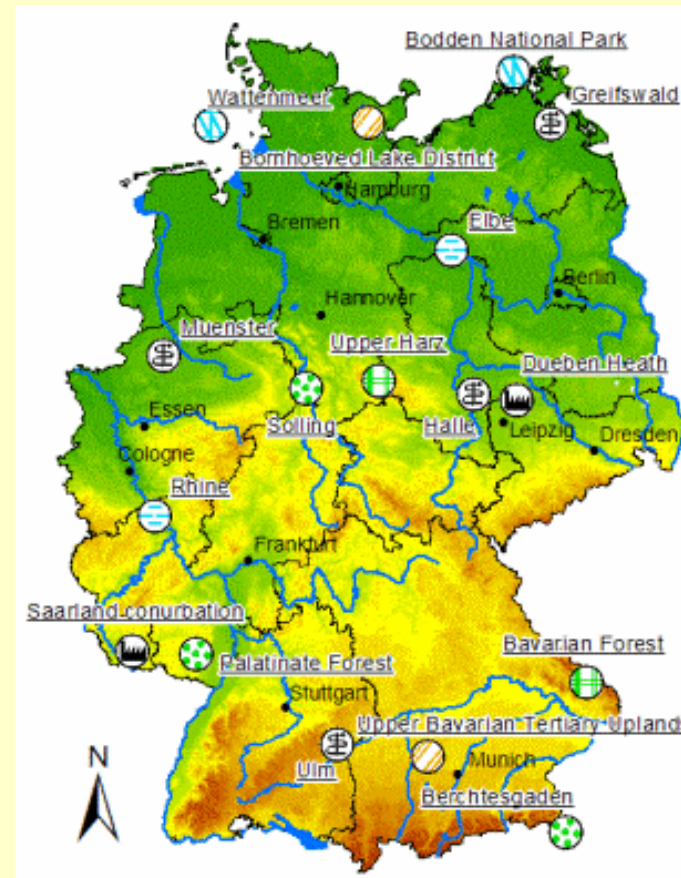
DEFINITION

- Collection and long-term storage of representative human and environmental samples

FUNCTIONING

- All procedures are carried out according to SOPs
- Analytical laboratories are accredited (DIN ISO 17025)
- Data and results are managed by an information system
- Detailed information and data retrieval:

www.umweltprobenbank.de



Monitoring in the Wadden Sea

Bladder wrack (*Fucus vesiculosus*) - sampled 6x in the year, starting in February



Blue mussel (*Mytilus edulis*) – soft body

- sampled every year bimonthly, starting in February

Eelpout (*Zoarces viviparus*) - liver and muscle

- sampled annually May/June



Herring gull (*Larus argentatus*) - egg

- sampled annually April/May

All material is pooled, milled, fractionated (~10g) and stored above liquid Nitrogen

Sampling sites

Schleswig Holstein

Sylt-Römö-Watt: bladder wrack, blue mussel

Meldorf Bight: eelpout

Island Trischen: herring gull egg

Lower Saxony

Jadebay/Mellum:

bladder wrack

blue mussel

eelpout

herring gull egg



Continuously analyzed parameters

Bladder wrack

Blue mussel

Eelpout

Herring gull egg

length, width, height
shell weight
soft body weight

length, weight, age
liver weight
muscle weight

diameter, length, weight
shell weight
shell thickness

Hg, Cd, Cu, Pb, As
Se, Co, Ni, Ba, Cr
Fe, Mg, Mn, S, Tl, Zn

soft body:
Hg, Cd, Cu, Pb, As
Se, Co, Ni, MeHg

muscle:
Hg, As, Se, Cu
liver:
Cd, Cu, Pb, Co, Zn

egg content:
Hg, As, Se, Tl, Cu, Pb

(chlororganics)

(chlororganics)

PCBs (7), DDTs, HCHs
HCB, OCS, Dieldrin, PeCBZ

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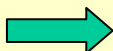
(PAH)

PAH (17)

water content, (fat)

water content, fat

water content, fat

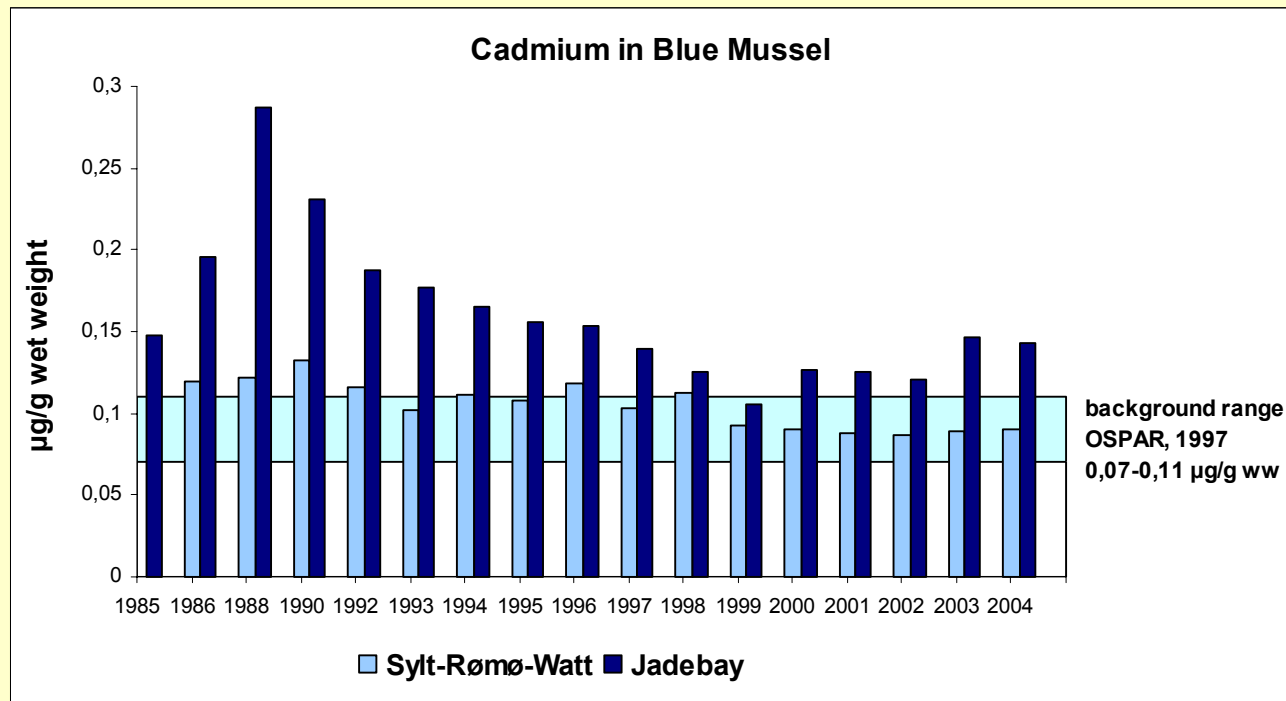


Data transfer to MUDAB

Selected Results and Assessment Criteria

Blue mussel – heavy metals

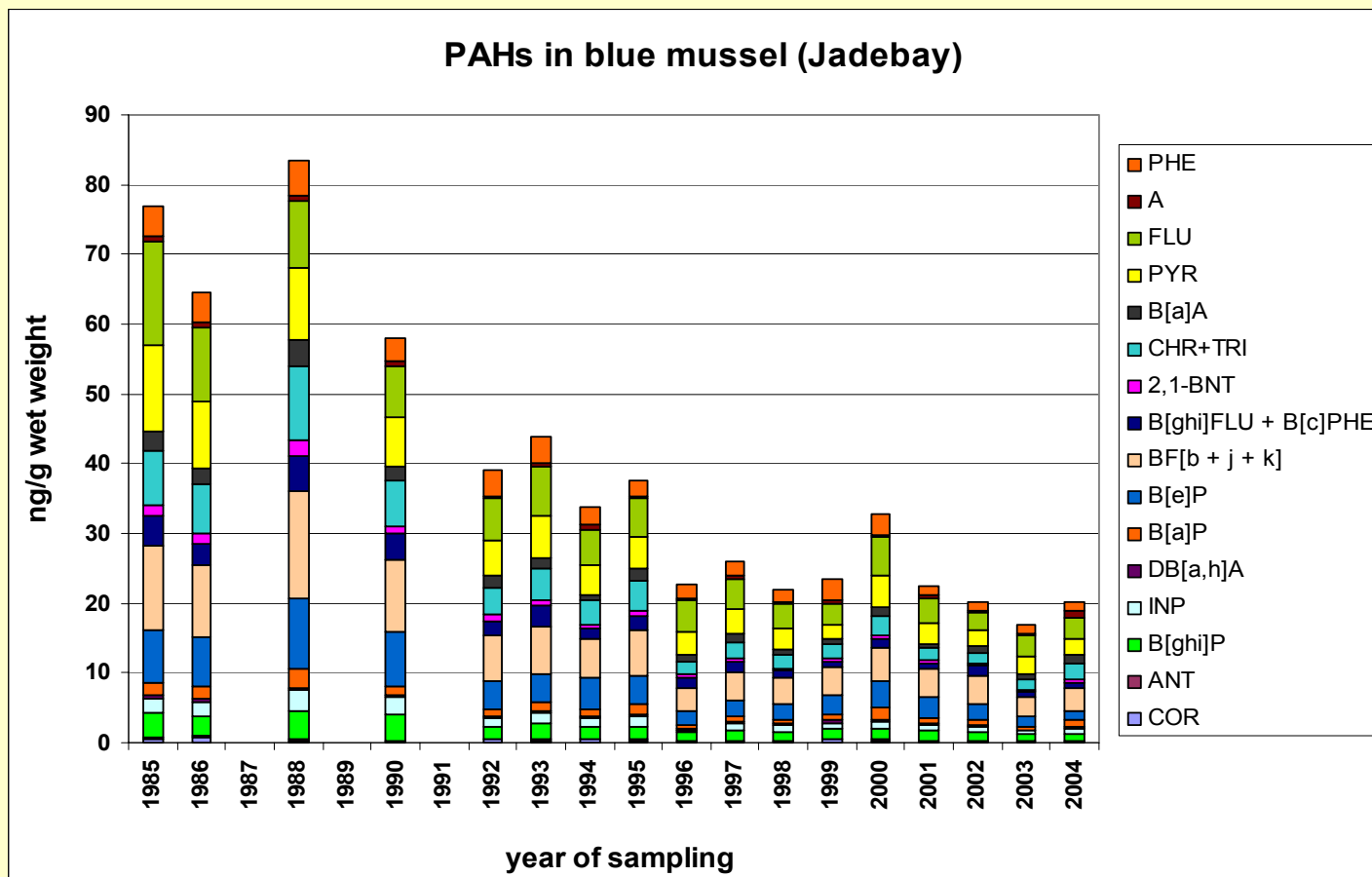
Assessment criteria: background ranges as established by OSPAR 1997 (for Hg, Cd, Cu, Pb, Zn)



Selected Results and Assessment Criteria

Blue mussel – PAHs

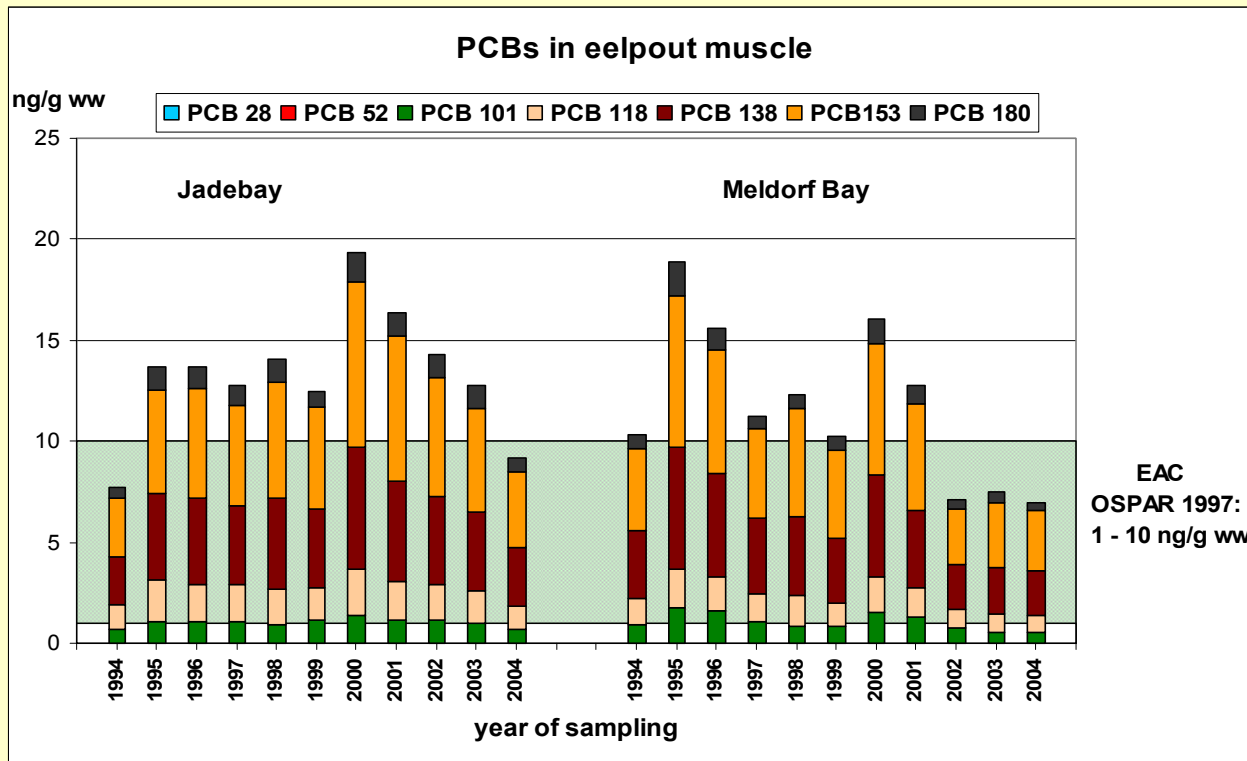
No assessment criteria



Selected Results and Assessment Criteria

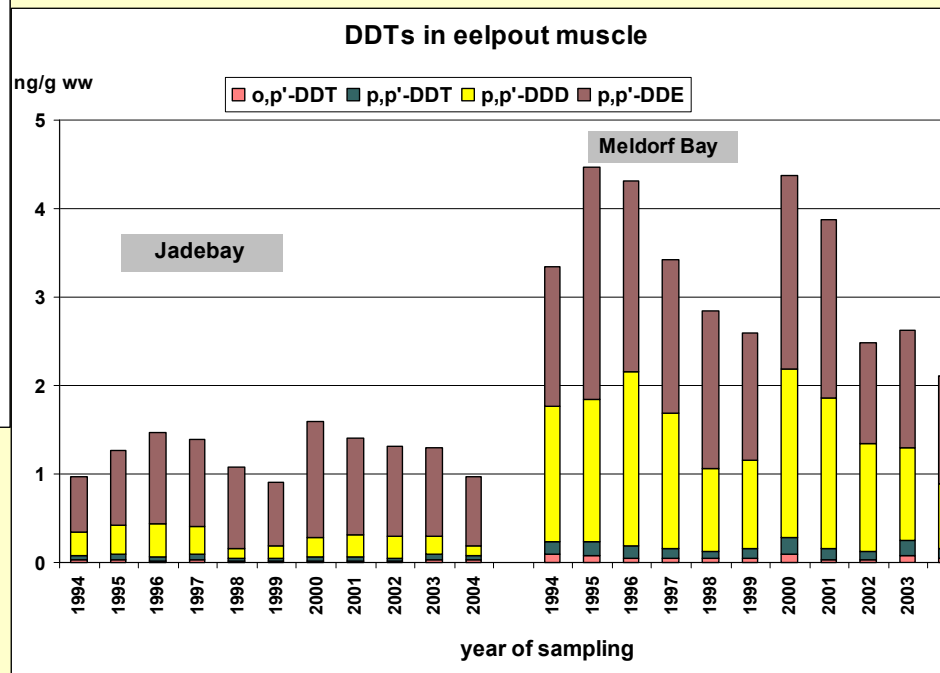
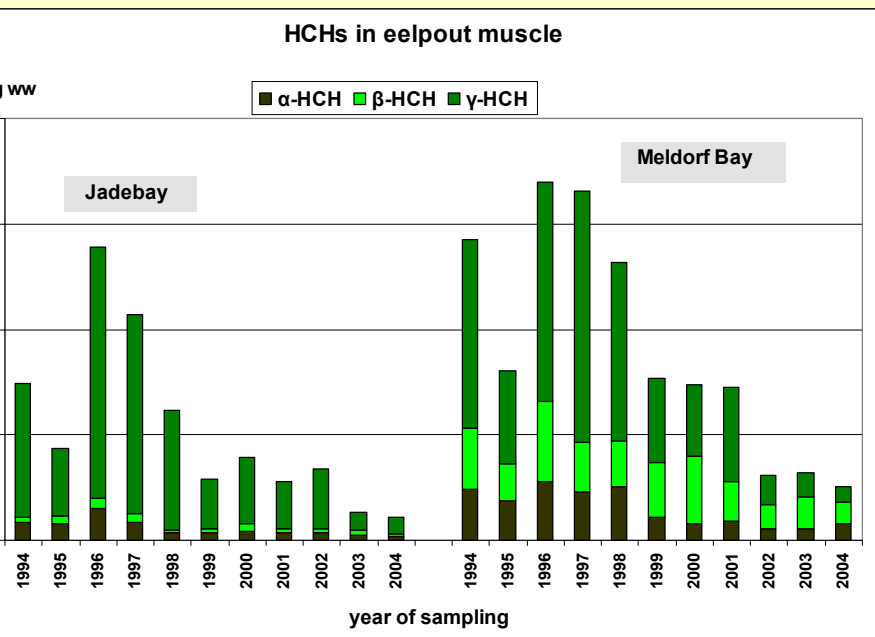
Eelpout muscle - PCBs

Assessment criteria: EACs (ecotoxicological assessment criteria) as established by OSPAR 1997 (for Σ_7 PCB)



Eelpout muscle – HCHs + DDTs

No assessment criteria



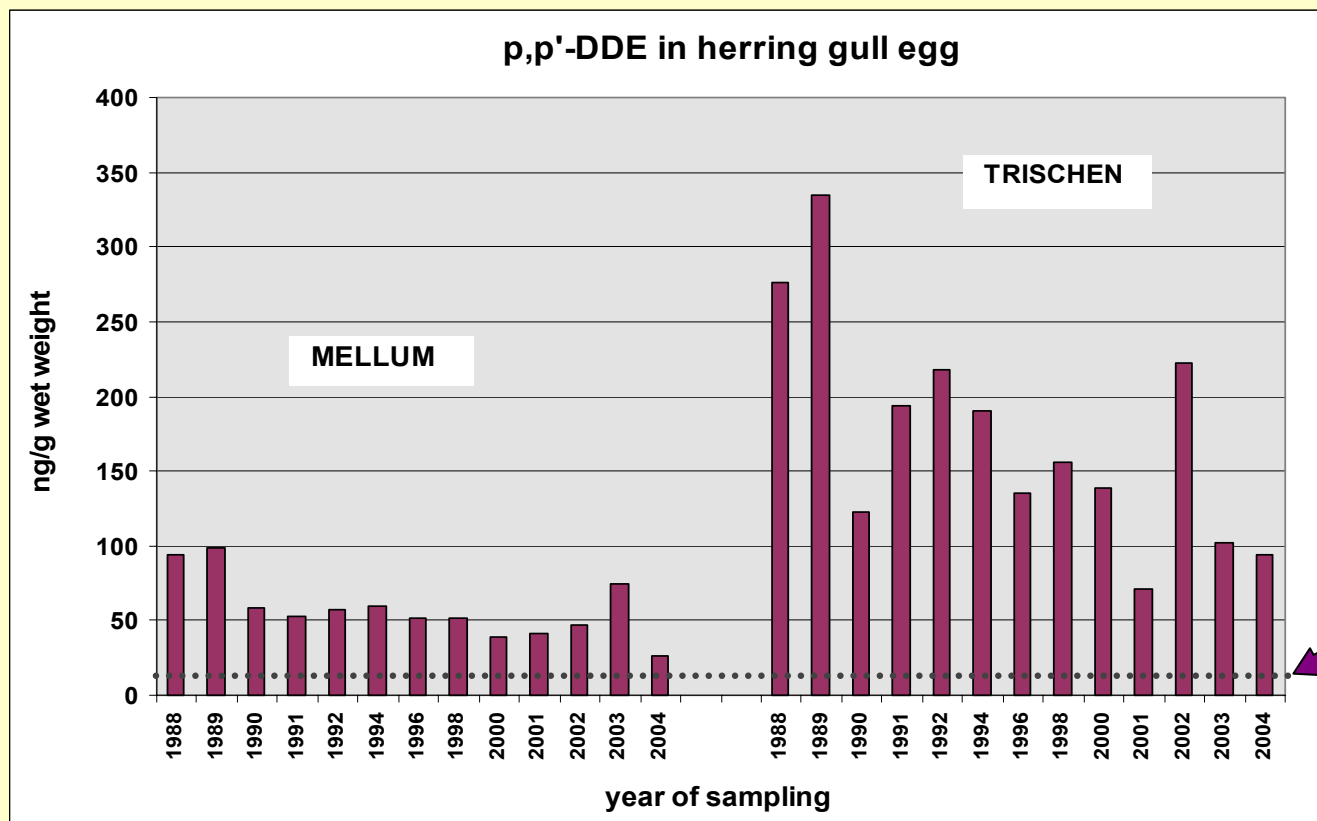
Eelpout sampled in Meldorf Bight reflects pollution inputs from the river Elbe

Selected Results and Assessment Criteria

Herring gull egg - DDTs

Assessment criteria: EcoQO Seabirds as proposed by ?

(for PCB, DDTs, HCHs, HCB)



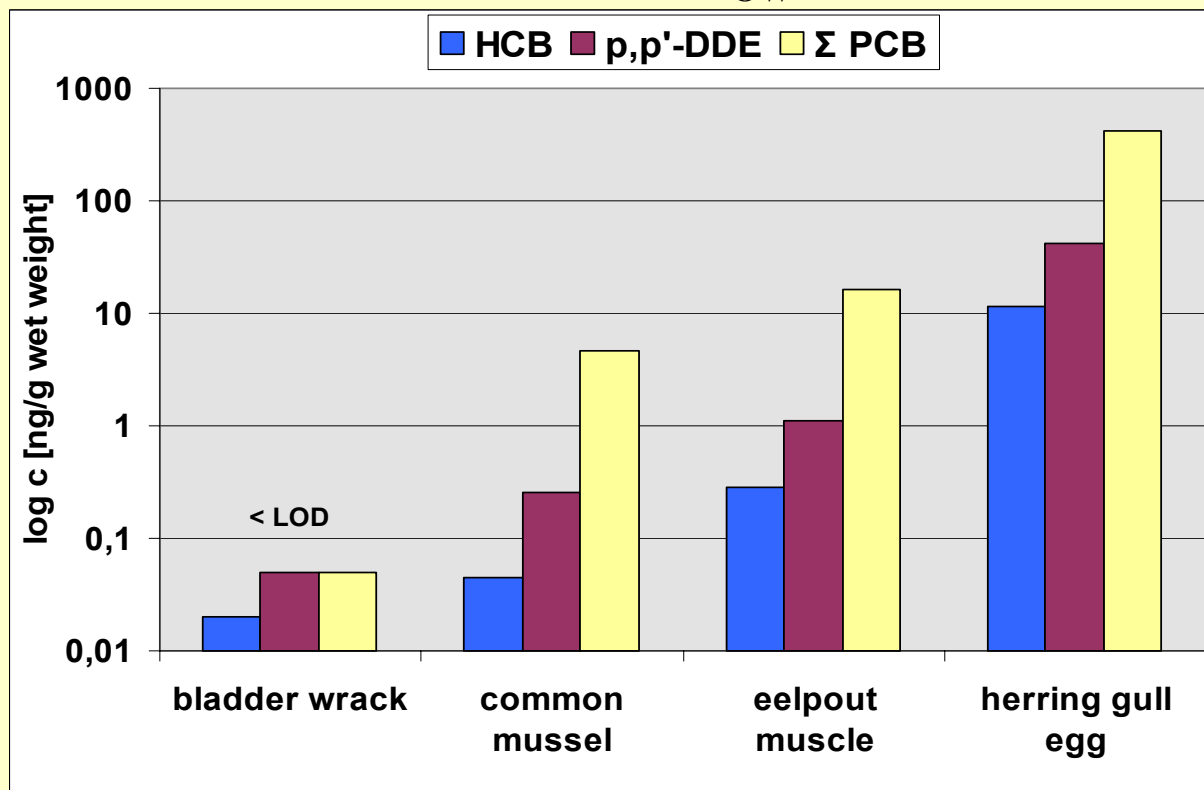
proposed
EcoQO Seabird
10 ng/g ww

Food web examinations

The set of specimen allows general statements regarding the accumulation or biomagnification of pollutants in the marine food web

Example:

Highly lipophilic compounds ($K_{OW} > 5$) in marine organisms



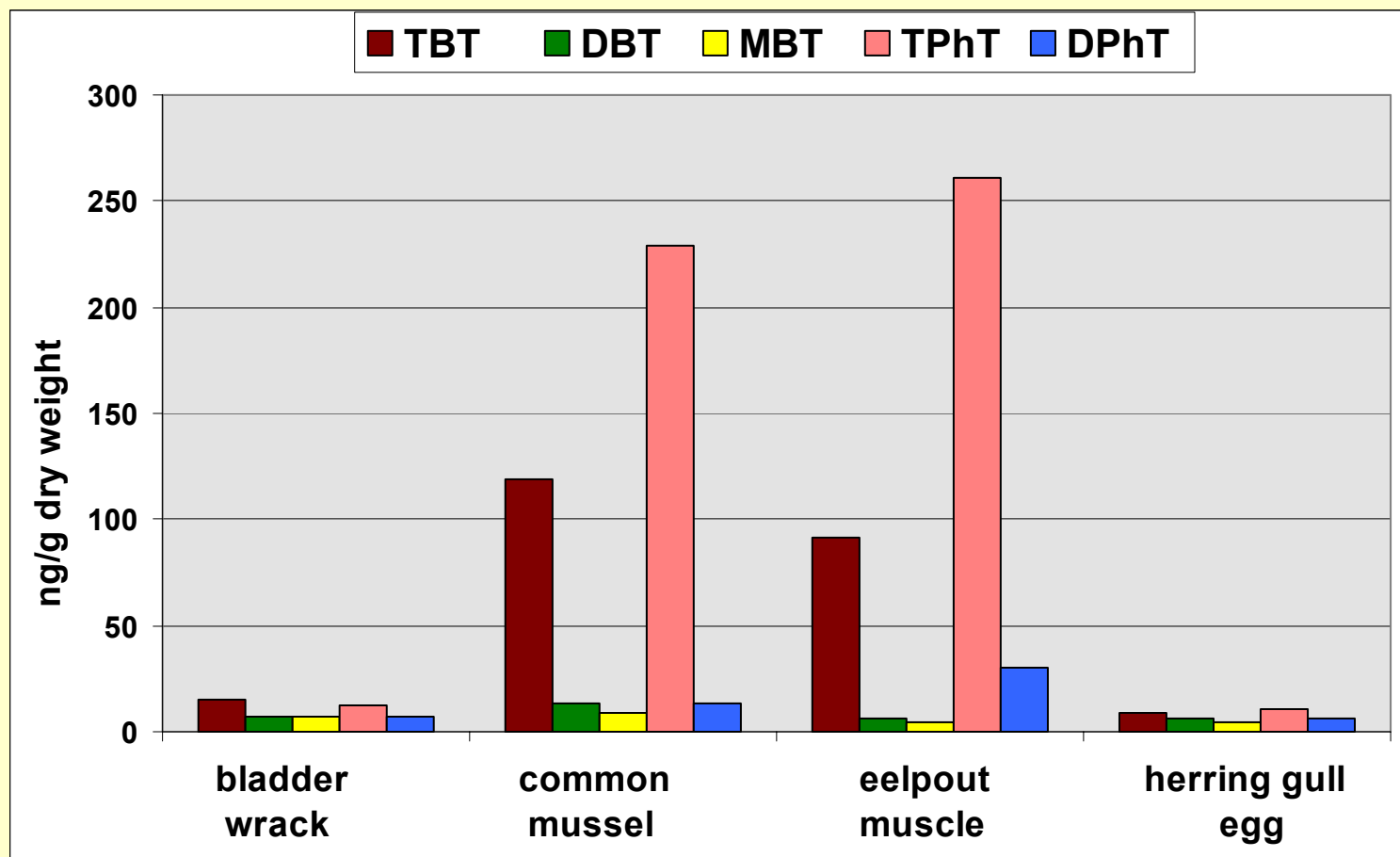
→ Eelpout but especially gull egg best suited for the analysis of POPs.

Retrospective study of Dioxins/Furans and coplanar PCBs in fish and eggs:

Organohalogen Compounds, 2005

Retrospective Investigations

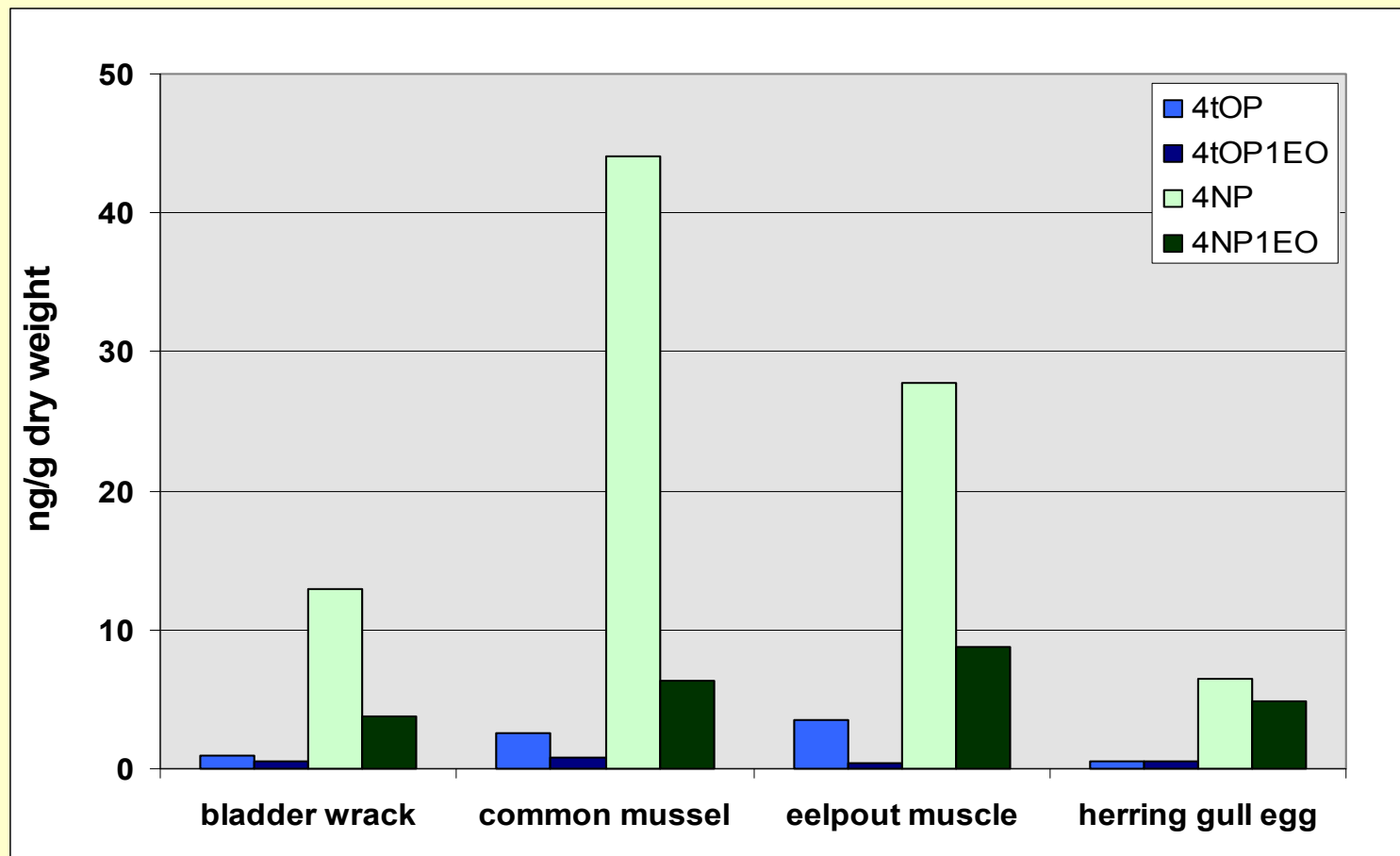
Organotin compounds in marine organisms (Jadebay, 1994)



Temporal trend in mussel → ES&T, 2003

Retrospective Investigations

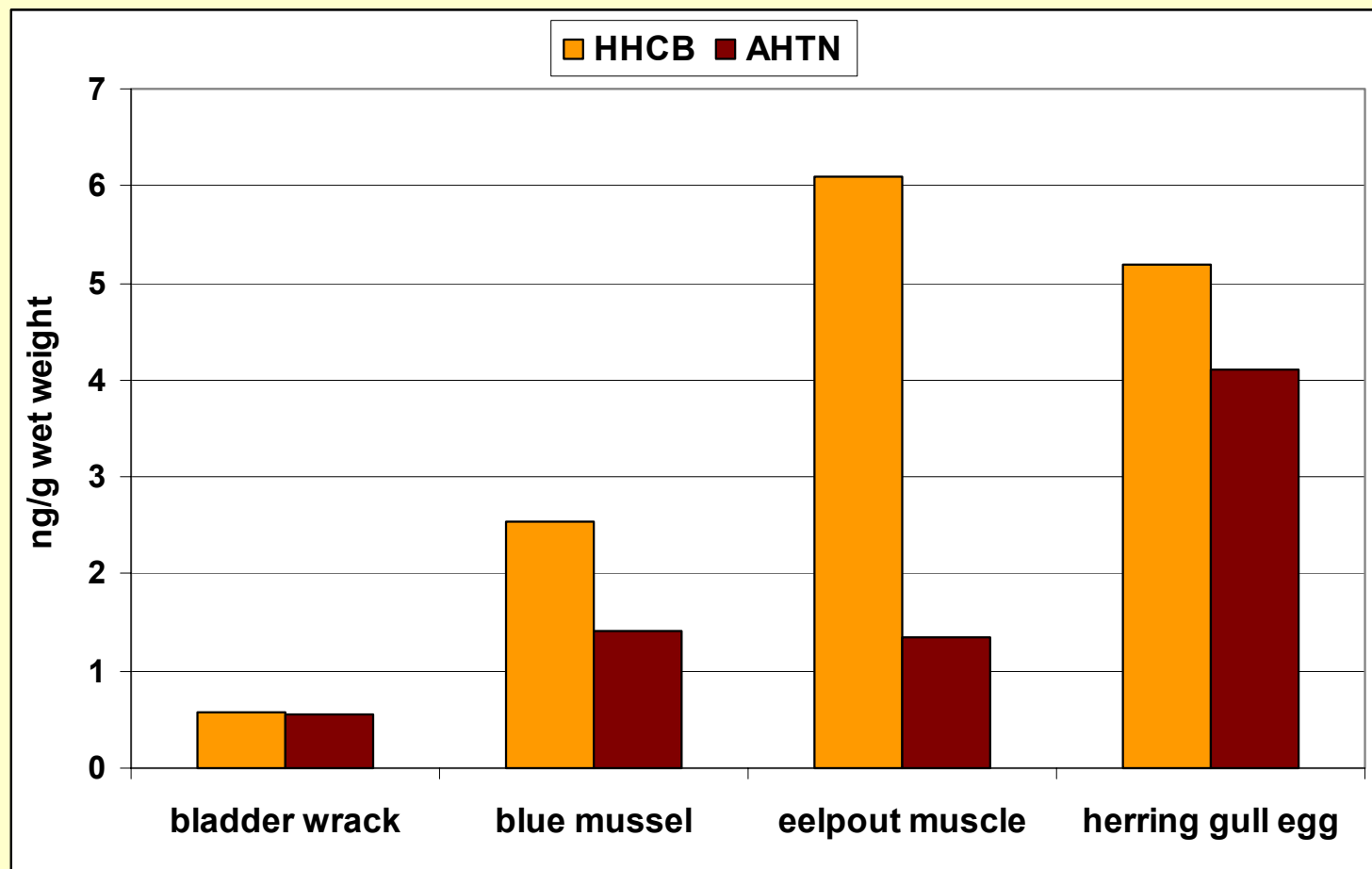
Alkylphenoles/-monoethoxylates in marine organisms (Jadebay, 1996)



Temporal trend in mussel → ES&T, 2004

Retrospective Investigations

Polycyclic musk compounds in marine organisms (Jadebay, 1998)



Temporal trend in mussel → [report on homepage](#)

Summary

- **Standardized sampling procedures result in reliable time trends**
- **ESB offers data from differently impacted regions**
- **The set of analyzed chemical parameters can be enlarged**
- **The set of specimen enables examinations along the food web**

Further assessment criteria would be helpful

ESB Team

University Trier (Saarbrücken) – sampling

Forschungszentrum Jülich – marine sampling until 1999

FhG-IME Schmallenberg – processing, archive, analysis

ERGO Hamburg – analysis (PAH, chlororganics)

...and, please, visit our homepage

www-umweltprobenbank.de

