

# Monitoring and Mitigation of chemical contaminants in Northern Europe

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# OSPAR and HELCOM

- In principle, the aims of the regional seas conventions and Defra in the UK are the same
- “a vision of clean, healthy, safe, productive and biologically diverse oceans and seas”
- It recognises though that, although open seas are less affected than inshore areas, human activity has resulted in adverse changes to marine life, and impacts

# Monitoring

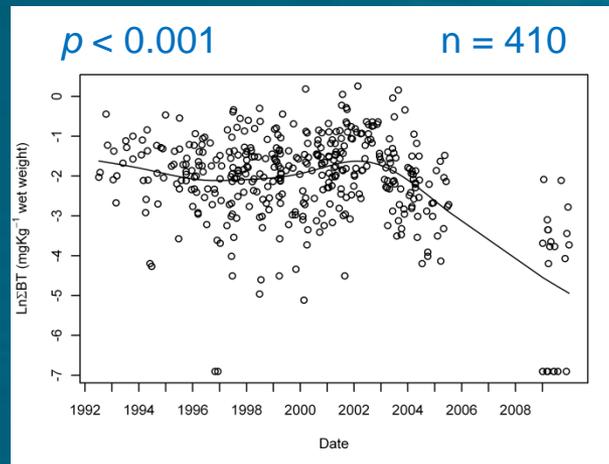
- Both OSPAR and HELCOM have comprehensive and co-ordinated monitoring programmes to which contracting parties are committed
- A number of matrices are included, but sediments and biota are prioritised
- ICES DOME database holds their data
- This does not include marine mammals, either via strandings or biopsies

# Inputs

- Input estimates to rivers and the marine environment are also tracked, and have generally declined over time due to regulatory controls (both national and international)
- Within the UK CSIP, time trends have been followed primarily in porpoises
- With one exception, these have been downwards over time

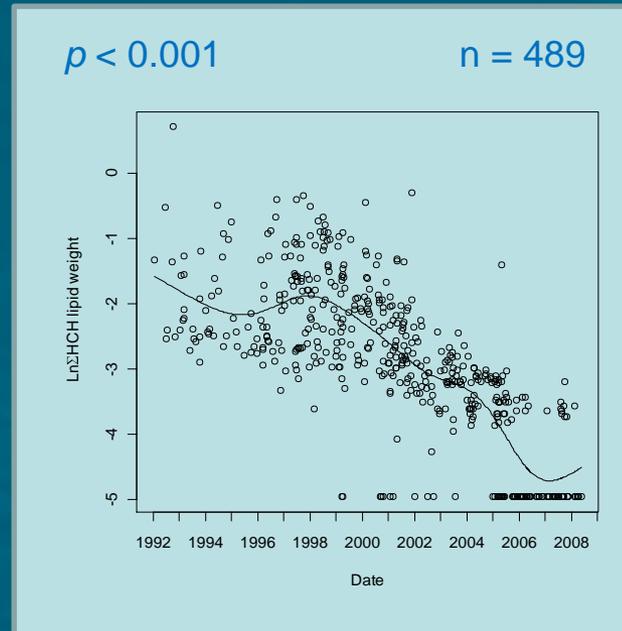
# Butyltins

- IMO ban on use of TBT paints 2003-2008
- porpoise livers analysed 1992-2005 & 2009
- 1995 – TBT detected in 100% of samples
- 2009 – only found in 4.3% of samples



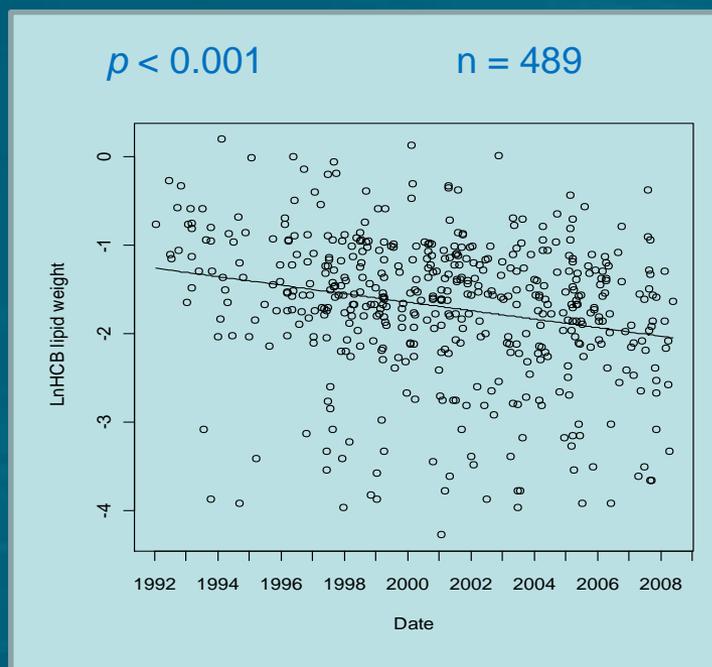
# Hexachlorocyclohexanes

- use of lindane in agriculture banned in 2009 under the Stockholm Convention
- pharmaceutical use continued until 2014



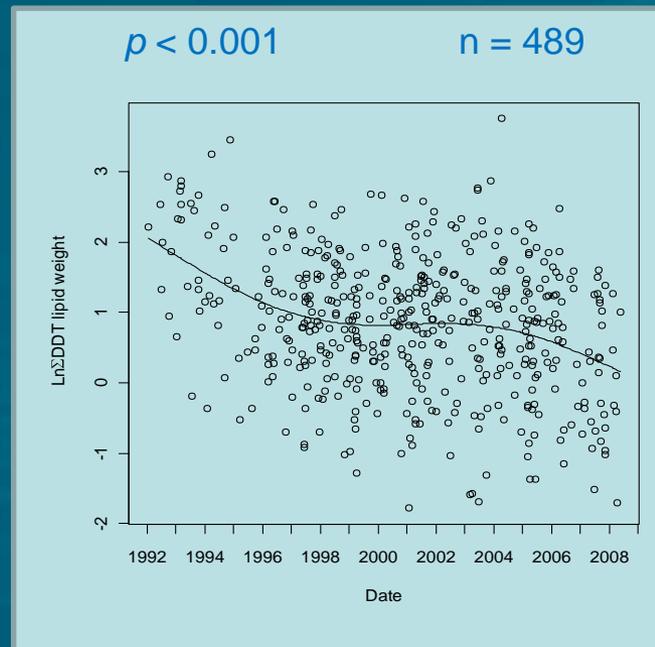
# Hexachlorobenzene

- Use of hexachlorobenzene as a fungicide banned in 2009 under the Stockholm Convention



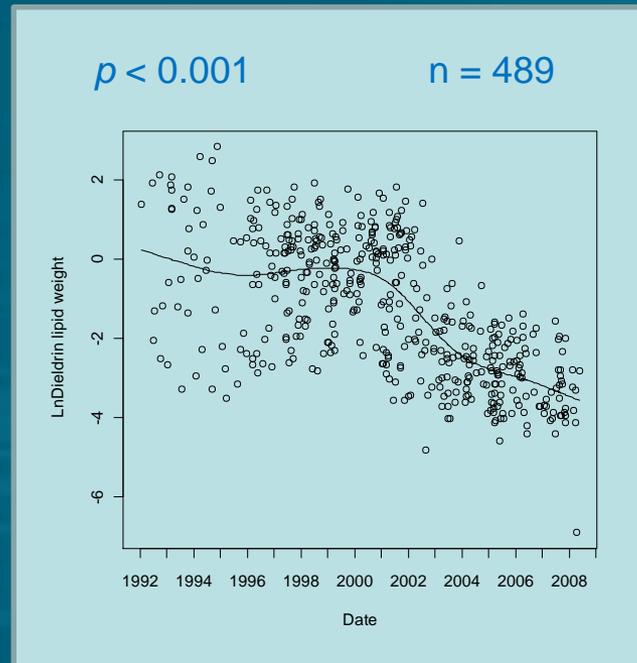
# Sum DDT

- use in agriculture banned in UK in 2009 under the Stockholm Convention
- in porpoises,  $p,p'$ -DDE predominates



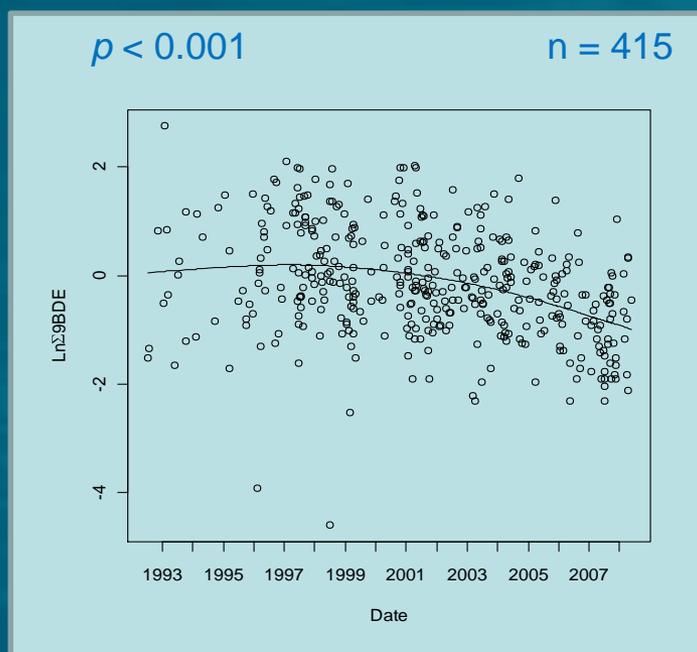
# Dieldrin

- Use of dieldrin (and aldrin) banned in most countries ca. 1970s-1980s – also in the initial group of Stockholm Convention POPs



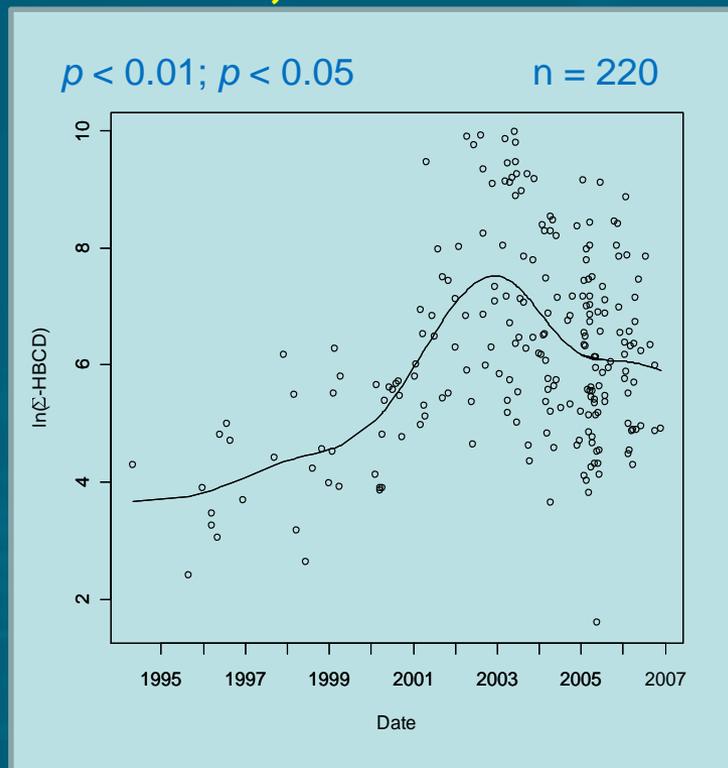
# Brominated diphenyl ethers

- penta- and octa-mix products removed from EU market, probably before 2004
- congeners in porpoises reflect penta-PBDE



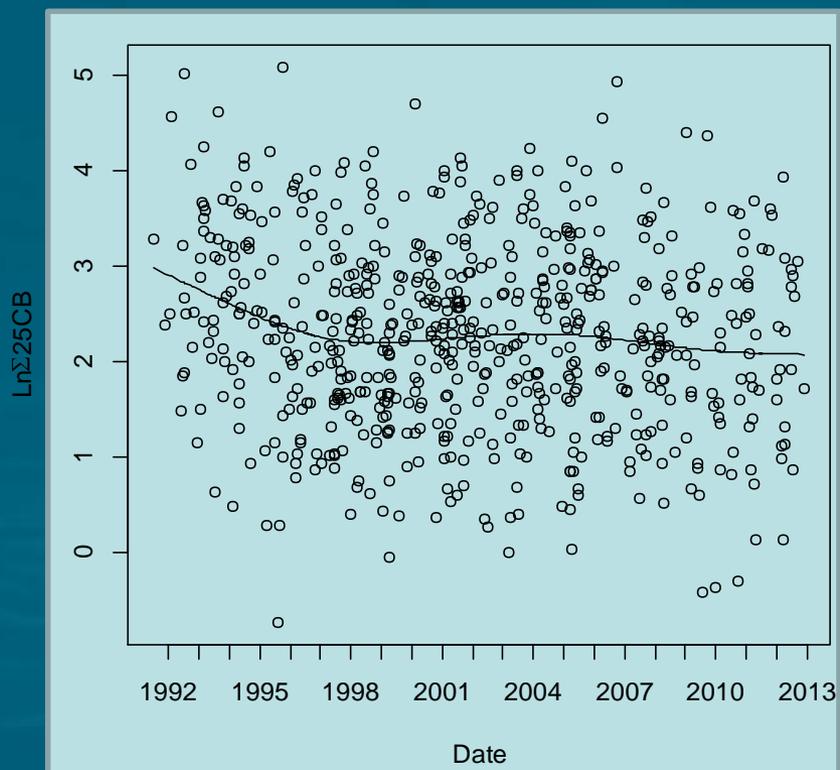
# Hexabromocyclododecane

- different time trend for HBCD
- upwards 2000-2003; downwards after 2003



# Chlorobiphenyls

- Closed uses of PCBs banned in 1981; full ban in 2000. UK production ceased 1981.



# PCBs

- Generally considered a problem solved by regulation in the 1980s
- True in many terrestrial environments
- Not true in marine mammals, declines have stalled, as shown earlier
- Each year, 40% of porpoises analysed are above the toxicity threshold associated with infectious disease mortality (immune suppression)

# Killer whales and others

- Extremely high levels of PCBs have been seen in killer whales, bottlenose and striped dolphins in industrialised areas of Europe (Jepson et al, 2016)

These are above a higher toxicity threshold, associated with reproductive impairment and failure

- Some populations are no longer reproducing

# Additional data

- For UK porpoises, information on dioxins and dl-CBs will be published soon
- An extension of the PCB time trend will follow shortly
- More HBCD data will soon be generated so as to be sure the decline continues
- PCB concentrations in blubber could become an indicator under MSFD D8

# What to do ?

- Reduce inputs further
- Safely destroy stockpiles of PCB waste
- Safely remove and destroy joint sealants
- Investigate leaching and remediation of insecure landfill sites
- Unfortunately there is a large repository of PCBs and deca-PBDE in sediments but, if not remobilised, these may stay contained