

MARINE POLLUTION INDICATORS(MPI)

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OBJECTIVES

1. to supply information on environmental problems, in order to enable policy-makers to value their seriousness;
2. to support policy development and priority setting, by identifying key factors that cause pressure on the environment;
3. to monitor the effects of policy responses.
4. To monitor the implementation of MSSD(2.7)
5. to facilitate the implementation of Ecosystem Approach and MEDPOL Inf.System



Policy and Strategy Needs

- Barcelona Convention
- Dumping Protocol
- LBS Protocol and SAP
- HW Protocol
- MSSD



Ecosystem Approach

- Management of coastal resources in a holistic manner
- Consider human activities as a whole
- Rational use of sciences in monitoring the impacts, effects and improvement
- Rational use of indicators for assessment

MEDPOL Inf.System

- Policy makers, stakeholders and media oriented.
- Based on internet portal
- Based on GIS system
- Cooperative action with ERS/RAC



DPSIR-Sources of Data

1. Driving force Indicators : ED Indicators MEDstat,country data,EEA and additional MEDPOL indicators
2. Pressure indicators :ED Indicators, MED stat,country data and additional MEDPOL indicators
3. State indicators : MEDPOL and national trends of levels, compliance and ecosystem stress monitoring programmes
4. Impacts indicators MEDPOL and national biological effects monitoring programmes
5. Response indicators :Ed indicators EEA and additional MEDPOL indicators



ROAD MAP

short term (2004-2006):

- **to develop methodology sheets for the set in line with existing sheets developed by related organizations;(Done)**
- **to undertake a test procedure in a few Mediterranean countries;(May-October 05)**
- **to review the set according to the results of the test(October –December 05)**
- **to undertake a Data gap analysis(October-December 05)**
- **to perform Capacity building and intercalibration programmes(2006)**
- **to coordinate the MEDPOL indicators activities with BP, MEDSTAT, SPA/RAC(2006)**
- **to develop quality indices on the basis of the core set of MPI adopted(2006)**
- **to undertake periodical evaluation.**



ROAD MAP

medium term (2006-2010)

- to develop monitoring programmes to generate relevant meta data;
- to confirm with national administration respective responsibilities on indicator production and data flows, in particular with EEA, MEDSTAT (and other organisations);
- to build into the MED POL priority data flows system what is needed for those indicators and put these on a regular cycle, either annual or regular;
- to develop methodologies and data flows for those indicators not yet developed;
- to develop and produce regular thematic and sector indicator-based reports;
- to develop modeling instrument for coastal risk assessment.



ED Indicators- Driving force- Pressure and Response

Population(10), Access
to fresh
water(13), Population
Growth
rate(18), coastal
development(27-
33), Sea(34-42), GDP
structure(43), Agricult
ure(50,51,53,57)

Fisheries(58-
62), Industry(63-
65), Tourism(79,80),

Environment(86,87,88,
89,91,97,98,99,100,101
,102,103,108,109,112)
Sustainable
Development(124,126)



Additional Indicators

- Inputs of industrial pollutants for points sources (MEDPOL)
- Qts of treated and untreated waste water(MEDPOL)
- WWTP in the region(MEDPOL)
- State of bathing water quality(MEDPOL)
- Trends of reduction of pollutants input(MEDPOL)



Biological State and effects Indicators

- **Phytoplankton species composition - % composition of key groups (number and biomass) Also described under Dominance Index**
- **Seasonal succession of key phytoplankton species (cells l⁻¹)**
- **Annual maximum density (cells l⁻¹) of each blooming phytoplankton species -Described above as Occurrence of nuisance species (HABS)**
- **Changes in population of key species**
- **Occurrence of nuisance species (HABS)**
- **Ecological quality index based on macrophytes**
- **Number of macrobenthic species**
- **Benthix**
- **Changes in the distribution area of habitats types**
- **Dominance Index**
- **Total phytoplankton biomass (mg m⁻³)**



Biological effects Indicators

- **Lysosomal stability**
- **Lipofuschine**
- **AChE**
- **BPH**
- **MTs**
- **GST**
- **CAT**
- **MDA**
- **Stress on stress**
- **Macrophage activity**
- **Micronuclei**
- **EROD (F)**
- **Bile FACs (F)***

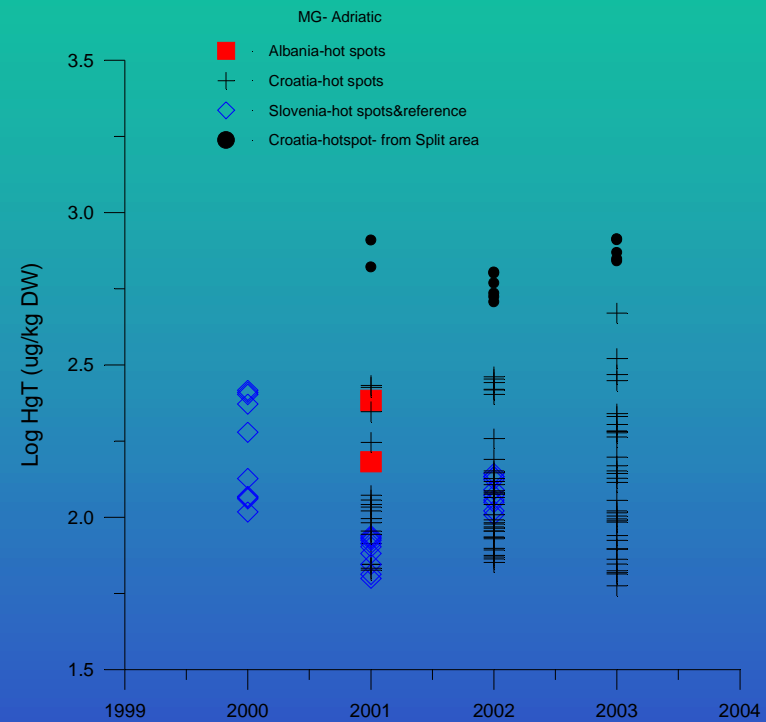


Chemical State indicators

- Total Mercury
- Total Cadmium
- Bacteriological count
- Bacteriological count
- BOD,
- COD,
- Nutrients
- Heavy metals
- PAH+
- HH+
- Temperature
- PH
- Transparency
- Salinity
- Ortophosphate
- Total Phosphorus
- Silicate-Sio2
- Dissolved oxygen
- Total nitrogen
- Nitrate
- Ammonium
- Nitrite
- Chorophyll-a
- Total Mercury
- Total Cadmium

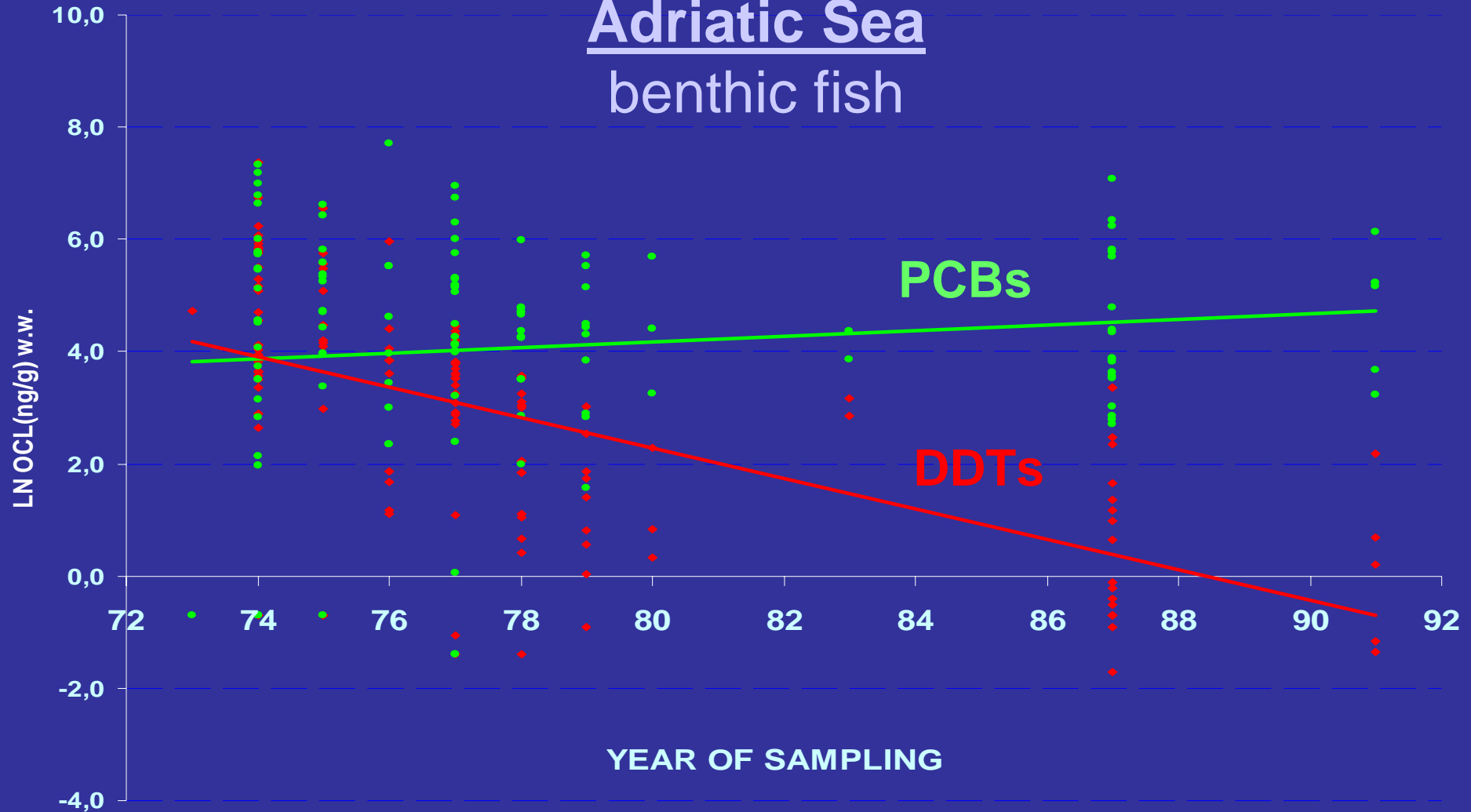


Levels of total mercury in MG from Hot Spots





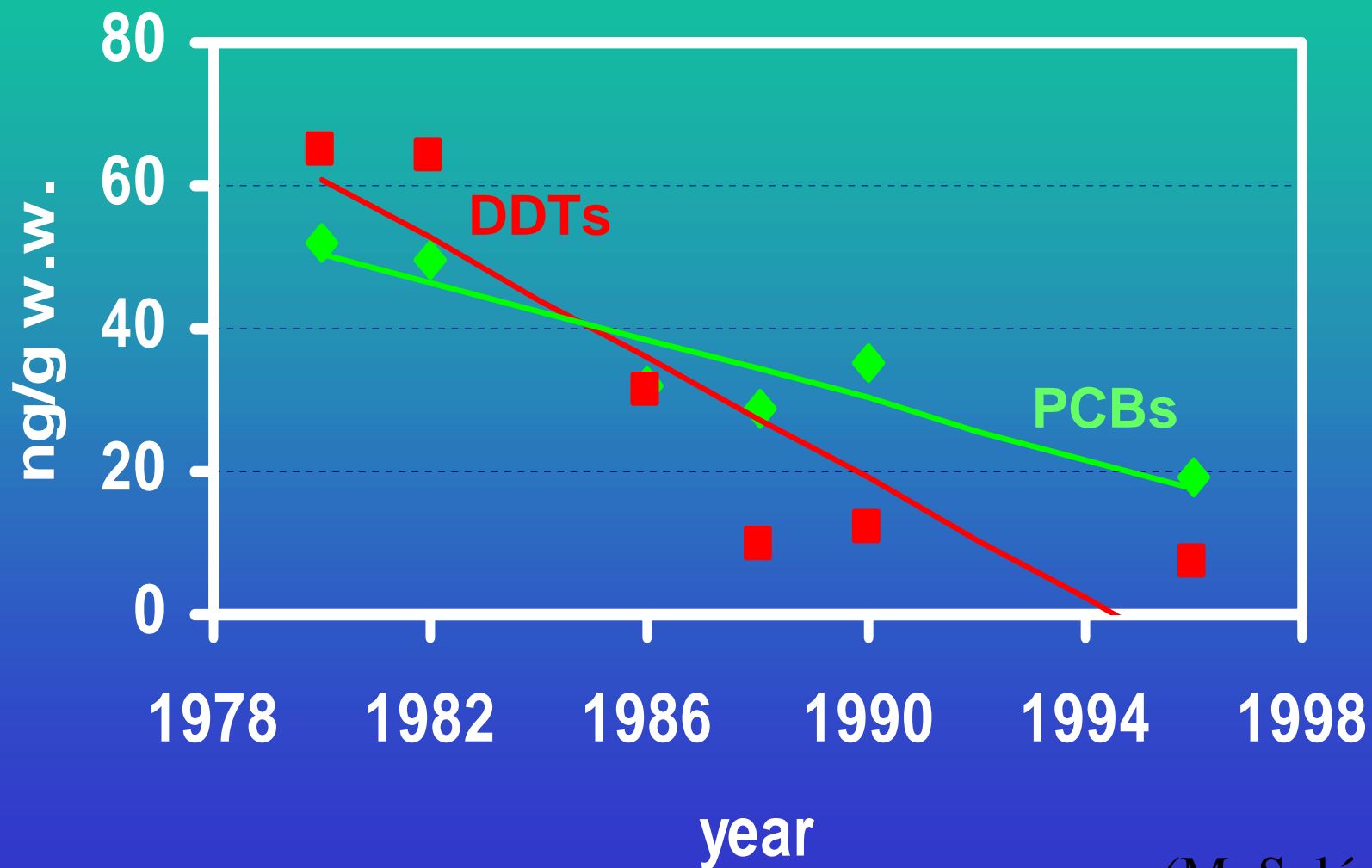
Adriatic Sea benthic fish



(M. Picer, 2000)



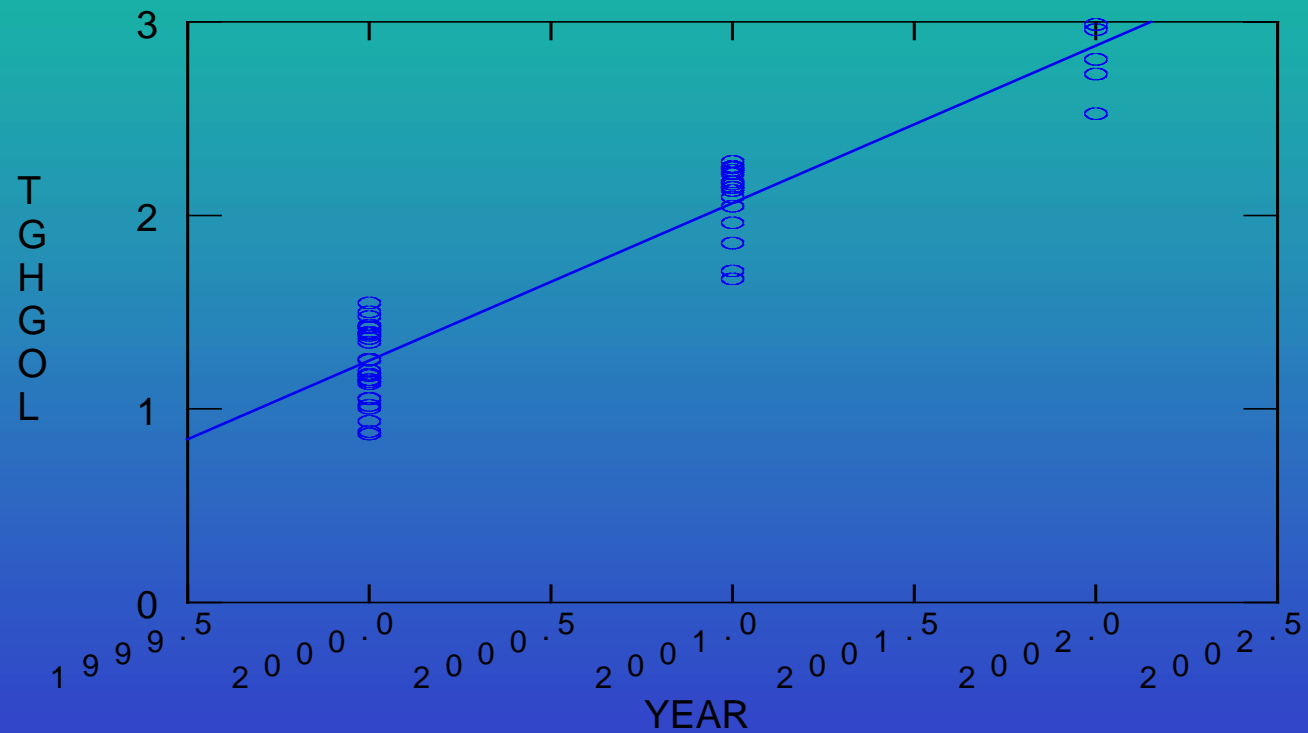
Temporal trends of PCBs and DDTs in mussels (Ebro Delta)



(M. Solé, 1998)

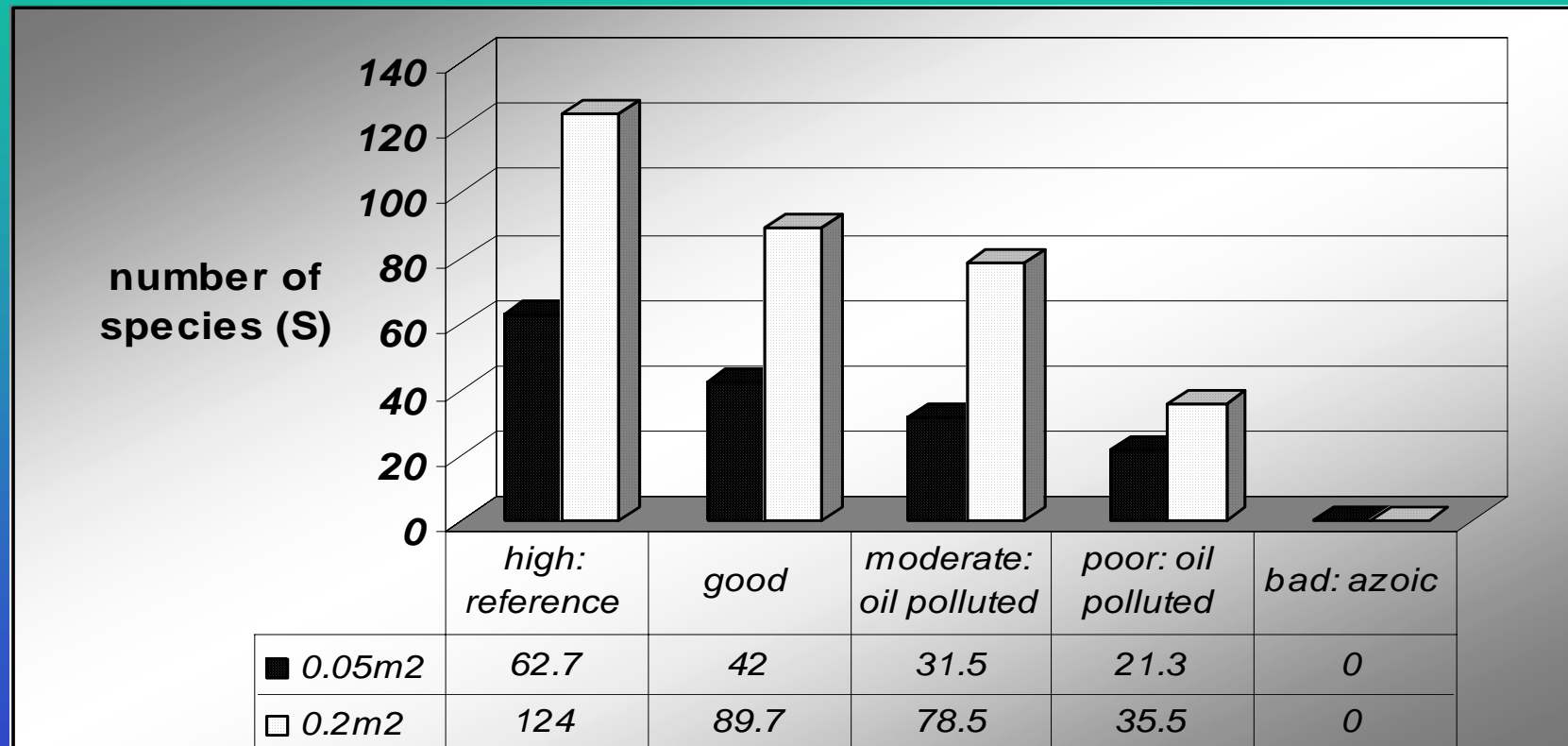


Logarithmic values of total mercury mass fraction in *Mullus barbatus* (MB) by year at station GOKSU in Turkish coastal waters





Response of species number to a oil pollution gradient in a given community type (shallow muddy sands). Source (NCMR, 2001).





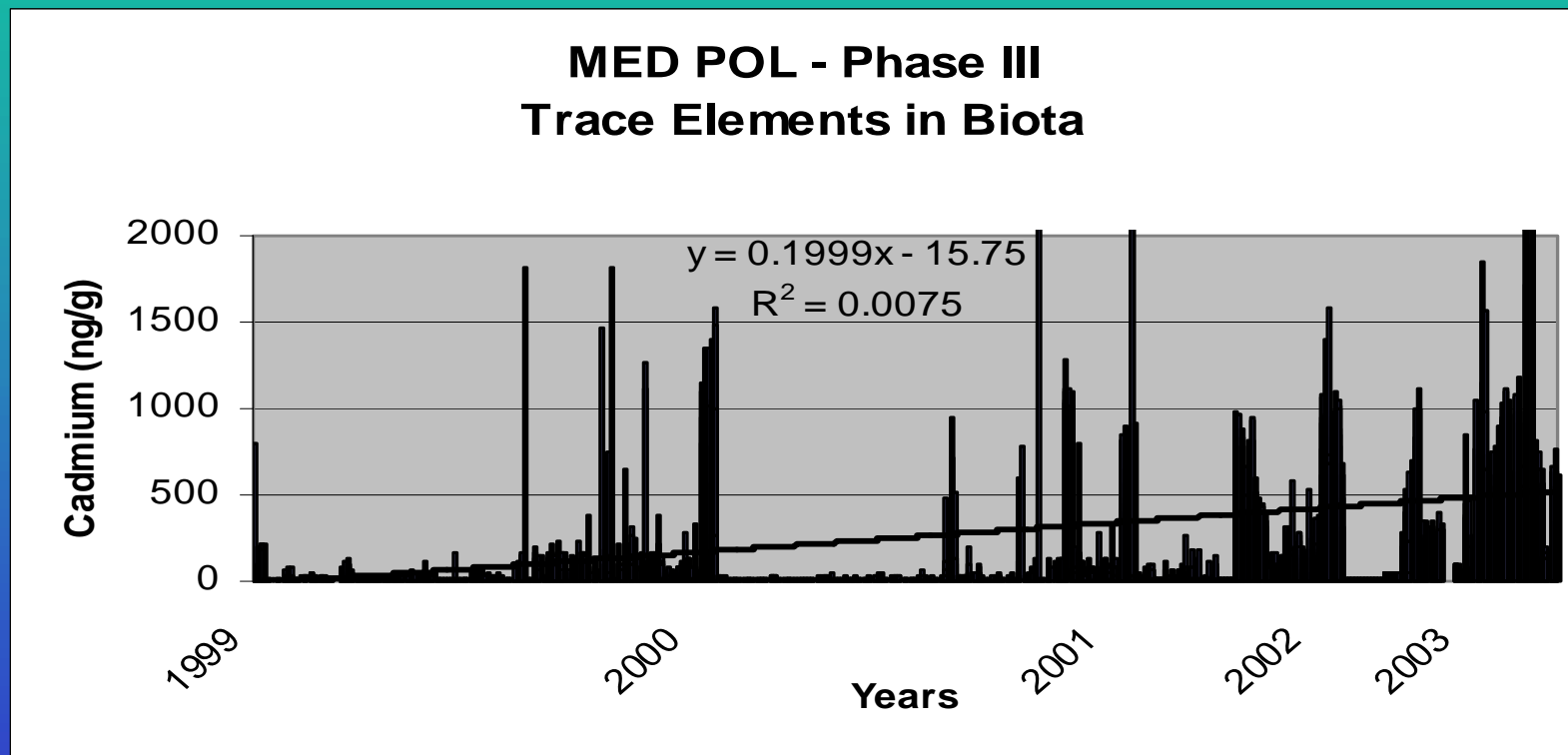
Distribution of the marine Angiosperm *Posidonia oceanica* and *Zostera* in the Mediterranean

Source: EEA, 2004





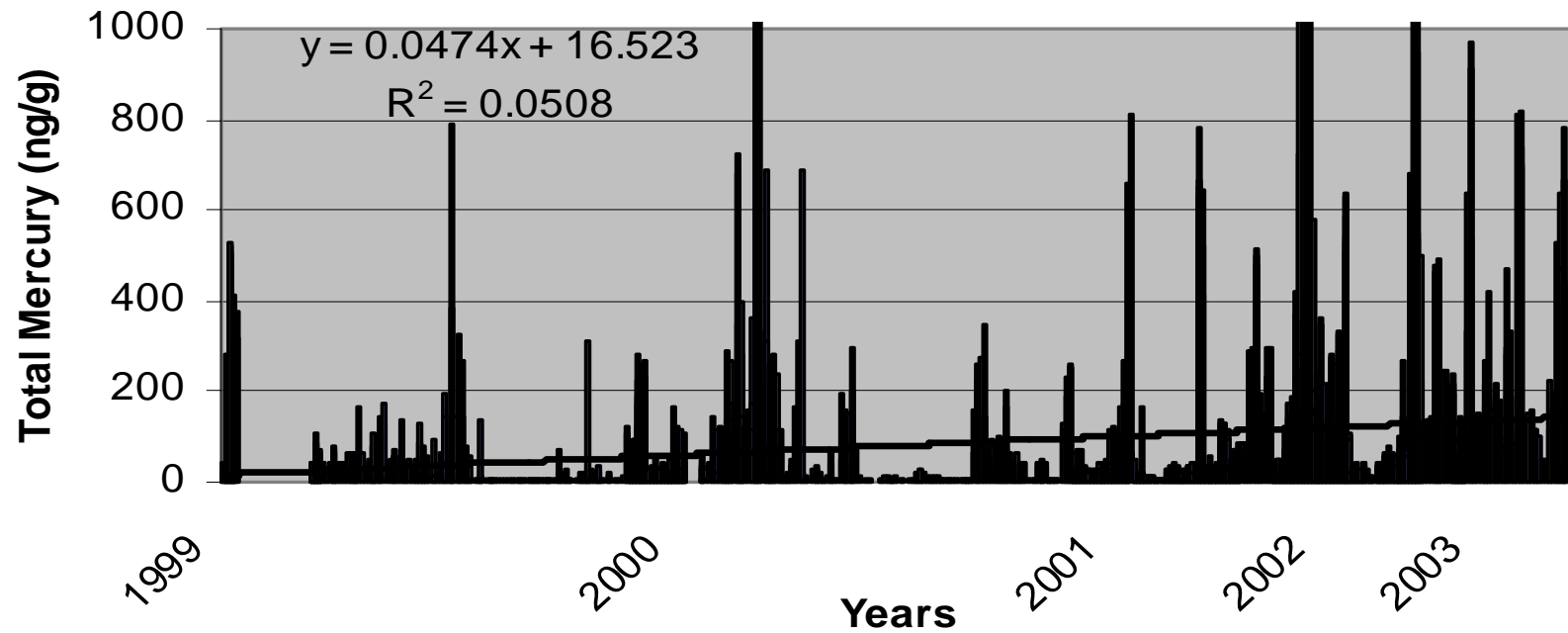
Cadmium in Biota

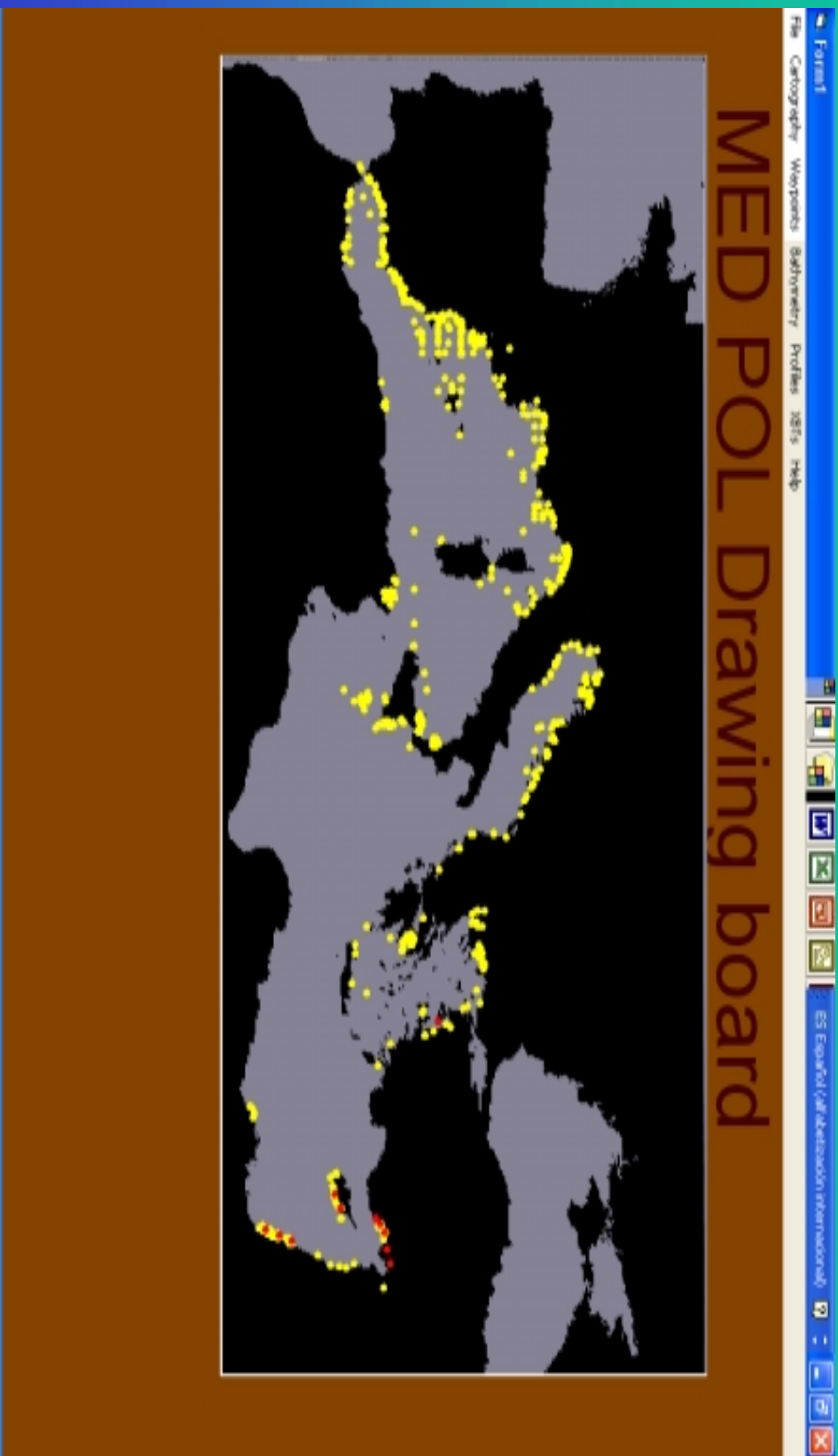




Total Mercury in Biota

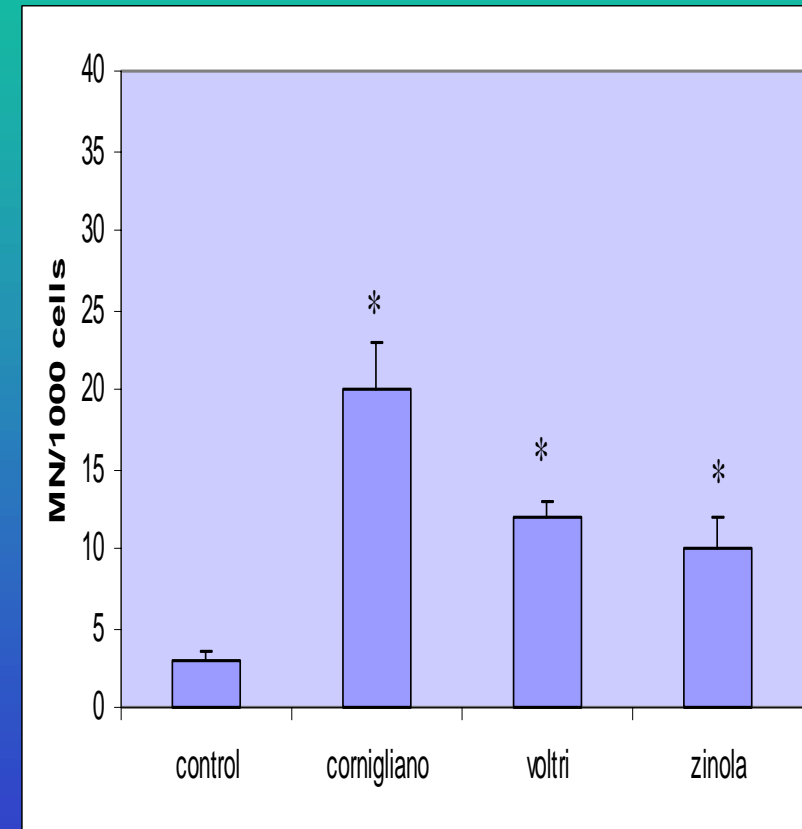
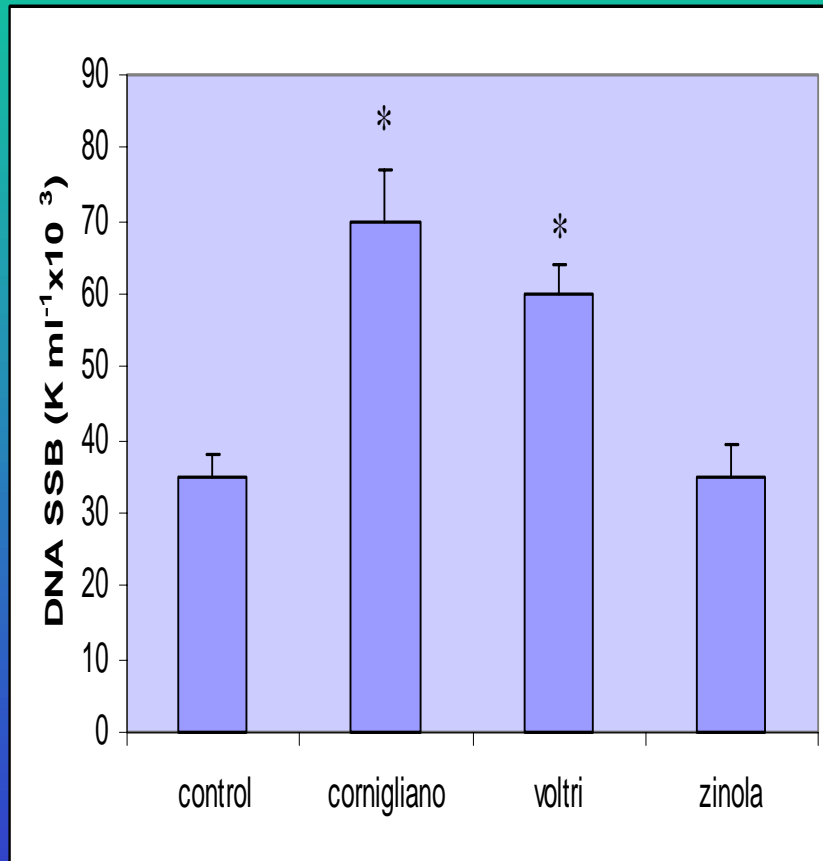
MED POL - Phase III Trace Elements in Biota







Biological effects programme along the Ligurian coast





Testing procedure

- Objectives
 - Availability of data
 - Quality of data
 - Estimation of MPIs
 - Identify barriers
 - Identify needs
 - Identify national experts
- Methodology
 - National experts +++
 - Regional experts ++
 - Questionnaires +



Thank you for your Attention