

“Capacity Building and Strengthening Institutional Arrangement”

Workshop: “Hazardous Substances and Wastes”

# Inclusion of Hazardous Substances in River Basin Monitoring Programmes

Mr. Nicola Pacini

APAT

Agency for Environmental Protection and Technical Services

## Index

1. Overall framework
2. Substance identification
3. Monitoring
4. Combined approach

# 1. Overall framework

## Sources

- Mining, manufacturing, processing generate DS emissions
- Waste disposal results into DS inputs into the environment
- Direct DS discharges and emissions to the atmosphere

## Strategic tools

- Control of emissions and processes
- Restrictions on marketing and use
- Authorisation and approval procedures
- Waste treatment and disposal

**+ EQS**

# 1. Overall framework

Directive 76/464/EEC  
of 4 May 1976 on pollution caused by certain dangerous substances  
discharged into the aquatic environment of the Community

- **Implementation:** internal surface waters, territorial marine waters, coastal and transitional waters and groundwater
- **Objective:** harmonise Member States' legislation concerning the discharge of dangerous substances in water bodies and act preventively on pollution sources
- **Tools:**
  1. 2 lists of substances depending on their potential hazard and the need for elimination or reduction;
  2. obligation for Member States to adopt a strategy based upon the establishment of emission limit values and on the identification of environmental quality objectives

# 1. Overall framework

Directive 2000/60/EC  
of the 23rd October 2000 establishing a framework for community action in the field of water policy

- **Implementation:** internal surface waters, coastal and transitional waters, groundwater
- **Objective:** obtaining a “good” ecological and chemical status for all waterbodies by 2015
- **Tools:**
  1. List of priority substances at the community level;
  2. Obligation for every Member State to adopt a combined approach for the control of dangerous substances by means of:
    - definition of Environmental Quality Standards
    - adoption of the Best Available Techniques for the control of point sources
    - adoption of Good Environmental Practices for the control of diffuse sources

# 1. Overall framework

Dangerous substances policy anticipated by the WFD:

1. Decision 2455/2001/EC: replacement of the dangerous substances list
2. WFD Article 16(7): define EQS
3. WFD Article 16(6) and 16(8): set emission controls

## 2. Substance identification

### The COMMPS procedure

A **C**ombined **M**onitoring-based and **M**odelling-based **P**riority **S**etting (**COMMPS**) procedure was developed

In the application of the COMMPS procedure about 820 000 monitoring data from waters and sediments from all Member States were evaluated and data for more than 310 substances on production, use and distribution in the environment were used for modelling if the available monitoring information was insufficient

"Study on the prioritisation of substances dangerous to the aquatic environment" can be ordered

"Revised proposal for a list of priority substances in the context of the water framework directive (COMMPS procedure)" can be downloaded  
[http://ec.europa.eu/environment/water/water-dangersub/pdf/commps\\_report.pdf](http://ec.europa.eu/environment/water/water-dangersub/pdf/commps_report.pdf)

## 2. Substance identification

### Procedure for the identification of dangerous substances in waterbodies

#### Simplified Risk Assessment

Selection based on an initial investigation of 330 substances:

- Tests concerning the intrinsic properties of a substance, its aquatic ecotoxicity and its indirect toxicity in relation to human health
- Database derived from 820.000 water and sediment monitoring events and from the implementation of exposure models
- Other factors that may lead to diffuse contamination such as production volume and the use made of a given substance
- Various exposure scenarios have been derived by combining the hazardous effects related to single substances

## 2. Substance identification

### Definitions

#### Substances of Community relevance

**Priority substances:** chemical pollutants of particular concern due to their widespread use and their high concentration in rivers, lakes and coastal waters

**Priority hazardous substances:** their high persistence, bioaccumulation and toxicity (PBT criterion) requires more stringent environmental objectives

#### Substances of Member State's relevance

Other chemical pollutants which impede the aims of the WFD

## 2. Substance identification

### Early evolution of hazardous substances policy

**1970s:** Rhine and other European river pollution events triggered the first DSD, *Dir 76/464/EC*

**1982:** The Commission proposes a List of 132 candidate substances

**1990:** 5 Daughter Directives set EQS for 18 hazardous substances

The Council asked the Commission to reconsider the proposal in the light of the IPPC

**1996:** IPPC Directive adopted, the 18 emission limit values are minimum requirements

The remaining substances were integrated by the WFD in 2000

## 2. Substance identification

### Hazardous Substances Lists

#### Directive 76/464/EEC

- List I: 18 substances identified and regulated at Community level
- List II: 139 substances identified at Community level and to be regulated by each Member State)

#### Directive 2000/60/EC

- List of priority substances : 33 substances identified at Community level, to be regulated by the end of 2004
- List of additional substances of potential concern found in individual river basins to be identified by each di Member State (Ann. VIII)

## 2. Substance identification

Repeal of the daughter directives of Dir 76/464/EEC:

- 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry
- 83/513/EEC of 26 September 1983 on limit values and quality objectives for cadmium discharges as amended by Council Directive 91/692/EEC (further amended by Council Regulation 1882/2003/EC)
- 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry as amended by Council Directive 91/692/EEC (further amended by Council Regulation 1882/2003/EC)
- 84/491/EEC of 9 October 1984 on limit values and quality objectives for discharges of hexachlorocyclohexane as amended by Council Directive 91/692/EEC (further amended by Council Regulation 1882/2003/EC)
- 86/280/EEC of 12 June 1986 on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC as amended by Council Directive 88/347/EEC, 90/415/EEC and 91/692/EEC (further amended by Council Regulation 1882/2003/EC)

## 2. Substance identification

### Decision 2455/2001/EC

establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC

### 33 Priority substances



To be **eliminated** from all discharge

to be **reduced** in all discharge

by 2020

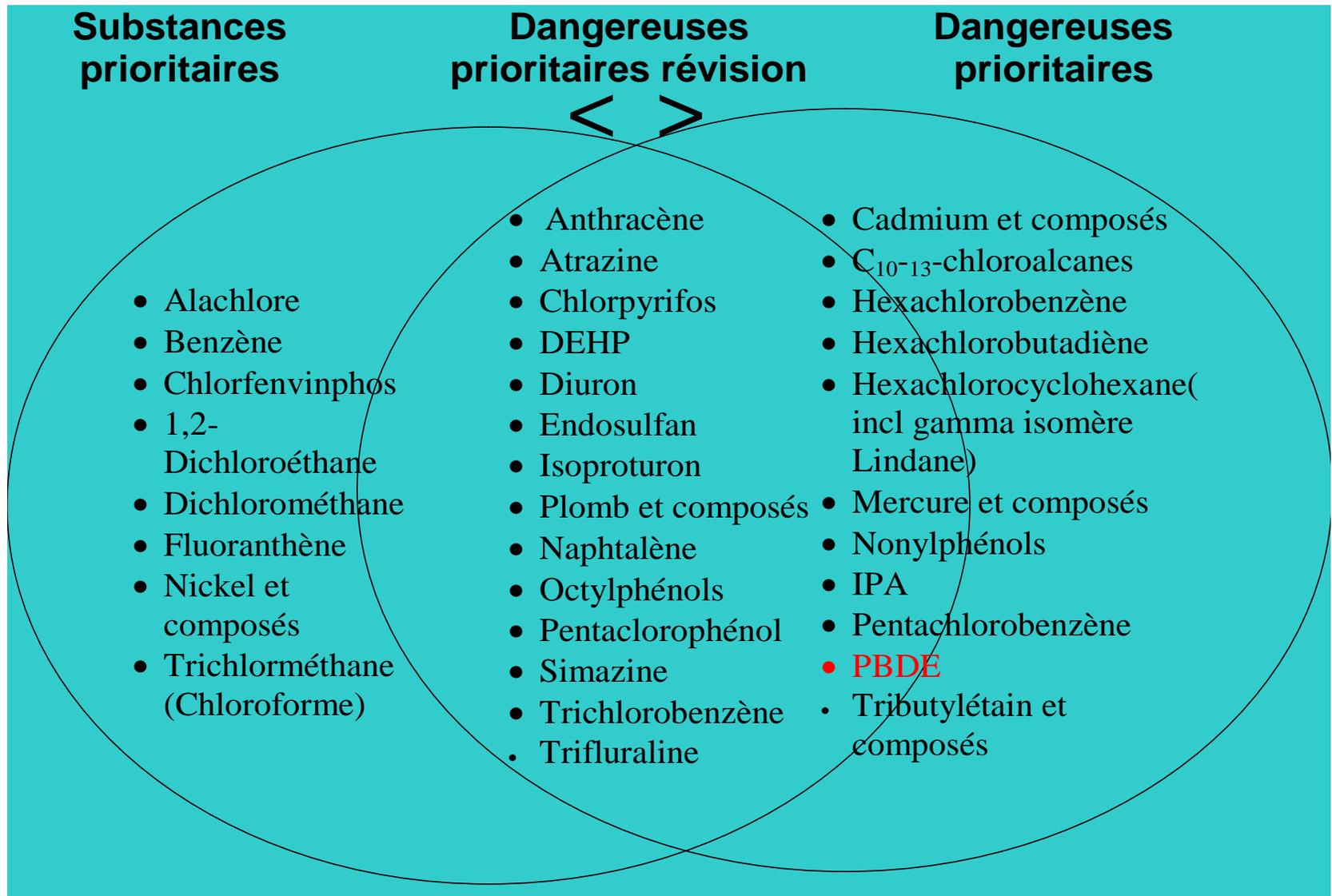
## 2. Substance identification

### List of Priority Substances Decision 2455/01 (Ann. X)

#### Priority hazardous substances

Cd and compounds	Benzene	Simazine
Hg and compounds	1,2,4 Trichlorobenzene	Chlorfenvinphos
Ni and compounds	1,2 Dichloroethane	Chlorpyrifos
Pb and compounds	<b>Hexachlorobutadiene</b>	Alachlor
Tributyltin compounds	Trichloromethane	Trifluralin
<b>Polyaromatic hydrocarbons</b>		Pentachlorophenol
<b>Pentachlorobenzene</b>	Benzo(a)pyrene	Endosulfan
<b>Chloroalkanes</b>	Benzo(b)fluoroanthene	(alpha-endosulfan)
Pentabromo diphenylether	Benzo(k)fluoroanthene	Lindane
Benzo(g,h,i)perylene	Dichloromethane	Atrazine
<b>Brominated diphenylethers</b>	Diuron	Indenol(1,2,3-cd pyrene
<b>Hexachlorocyclohexane</b>	<b>Nonylphenols</b>	Anthracene
<b>Hexachlorobenzene</b>	4 (para)-Nonylphenol	Fluoranthene
Octylphenols	Naphthalene	Isoproturon
(para-tert-octylphenol)	Di(2-ethylhexyl)phthalate	

## 2. Substance identification



## 2. Substance identification

**Directive 2006/11/EC** of 15 February 2006

on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community

*Inland surface waters, territorial waters and internal coastal waters*

- "**pollution**": discharge by man, directly or indirectly, of substances or energy into the aquatic environment, the results of which are such as to cause hazards to human health, harm to living resources and to aquatic ecosystems, damage to amenities or interference with other legitimate uses of water.

**List I:** To be authorised with emission limits applying to WB and sewers

- Max Concentration of a substance permissible in a discharge
- Max Quantity of a substance permissible in a discharge during one or more specified periods of time
- more stringent Emission Standards taking into account PBT of receiving WB
- inventory of the discharges which may contain List I substances

## 2. Substance identification

List II: Pollution reduction programmes

emission standards shall be laid down based on EQS in accordance with Council Directives

specific provisions on composition and use of substances taking into account the latest economically feasible technical developments

Programme content and deadlines checked by Comm and compared among countries

send information to the Commission on the implementation of this Directive, in the form of a sectoral report

## 3. Monitoring

### Water Framework Directive 2000/60/CE

#### Monitoring

- Surveillance monitoring: required for the evaluation of the effects of the measures implemented and to plan future monitoring programmes
- Operational monitoring: required for the evaluation status in relation to EQS
- Investigative monitoring: required when pollution causes are unknown, in case of accidental pollution or in waterbodies which cannot reach an environmental objective.

## 3. Monitoring

### **Methodology for the control of dangerous substances**

- Identification of the dangerous substances which should be included in the first selection
- Analysis of the pollution sources present within the territory and identification of the dangerous substances relevant at river basin scale
- Monitoring of selected dangerous substances
- Comparison between monitoring results and environmental quality standards
- Implementation of targeted measures in waterbodies which exceed EQS

## 3. Monitoring

### Tools for the identification of pollution sources and dangerous substances

- **IUCLID**: European Commission Database containing scientific and technoproductive files for 2604 substances of high production volume in Europe
- **EPER**: European Polluting Emissions Register assembling information concerning the emission of substances in water and in the atmosphere
- **BREF**: Reference documents concerning Best Available Technologies, defined by the European Commission, with specific mention, for each industrial activity, of the substances which are potentially present in discharges
- **SIAN**: National Agricultural Information System set up by the Ministry of Agriculture and Forestry, containing information on pesticide sales at national level
- **Others**: National Bureau of Statistics (ISTAT), planning permissions and various autorisation regimes

# 3. Monitoring

EEA - EPER service - Microsoft Internet Explorer

Indirizzo: <http://www.eper.cec.eu.int/eper/map2.asp>

show facilities emitting: [All] show facilities in activity: [All] show emissions for: [Air] [Water] [Both]

**What is EPER ?**

- EPER search
  - Facility level
  - Industrial activity
  - EU15 / Member State overview
  - Pollutants
  - Map search
- EPER Review
- Download
  - EPER data (XML)
  - EPER Guidance document
- Links
  - National registers
  - EU / international organisations
  - Contact us
  - Acknowledgements

**All facilities in my country**

Select country: [ ]

**Glossary**

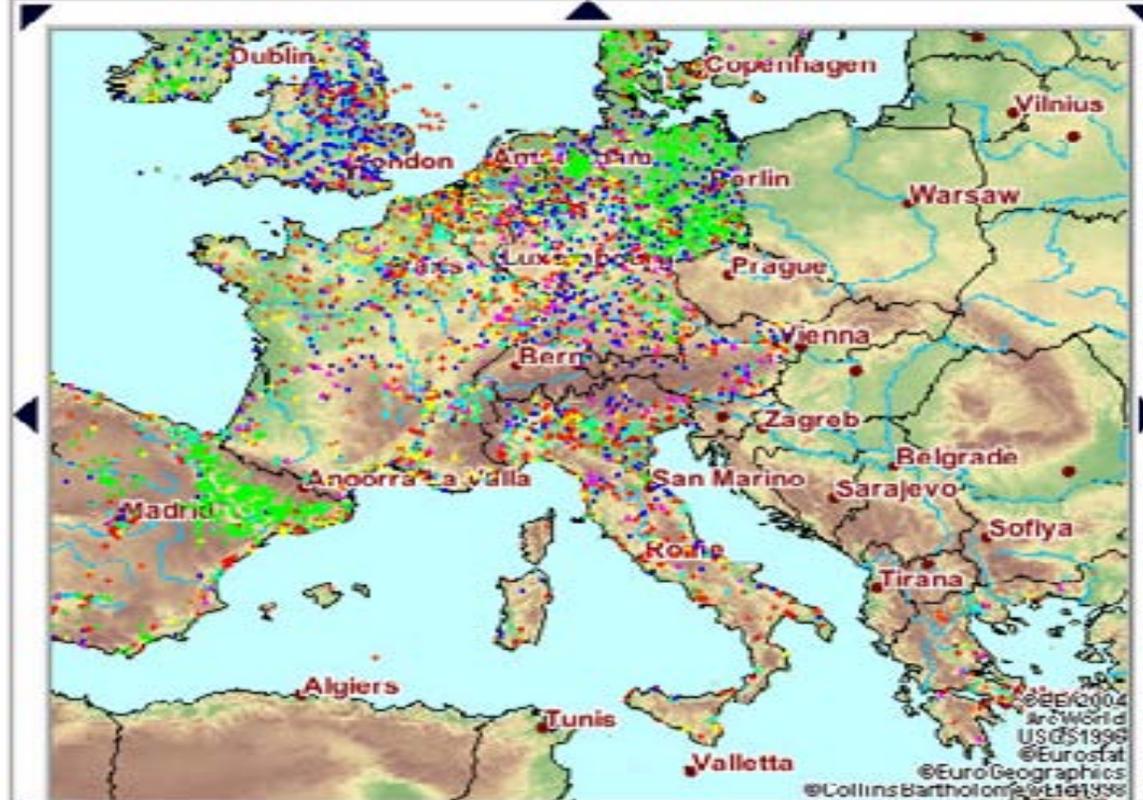
- EPER Facility

**Select tool for map interaction:**

- [Zoom In]
- [Zoom Out]
- [Info]
- [Full Screen]

**Legend:**

- 1 Energy Industries
- 2 Production and processing of metals
- 3 Mineral Industry
- 4 Chemical industry
- 5 Waste management
- 6 Other industrial activities
  - 6.1 Industrial plants for pulp and paper
  - 6.6 Installations for cooling towers



Operazione completata

Start | EEA - EPER service - Mi... | 18.11

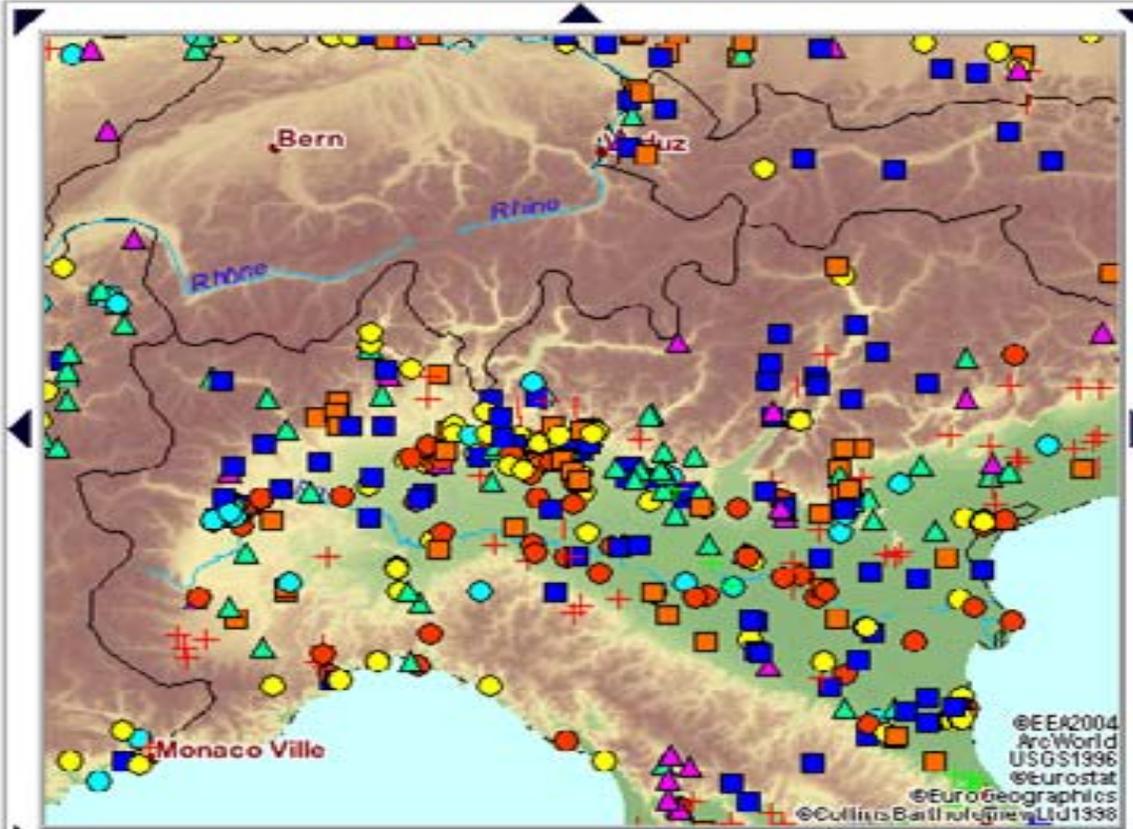
# 3. Monitoring

EEA EPER service - Microsoft Internet Explorer

Indirizzo <http://www.eper.cec.eu.int/eper/map2.asp>

show facilities emitting: All show facilities in activity: All show emissions to: Air Water Both

Select tool for map interaction:



Legend:

- 1 Energy industries
- 2 Production and processing of metals
- 3 Mineral Industry
- 4 Chemical industry
- 5 Waste management
- 6 Other industrial activities
- 6.1 Industrial plants for pulp and paper
- 6.6 Installations for power

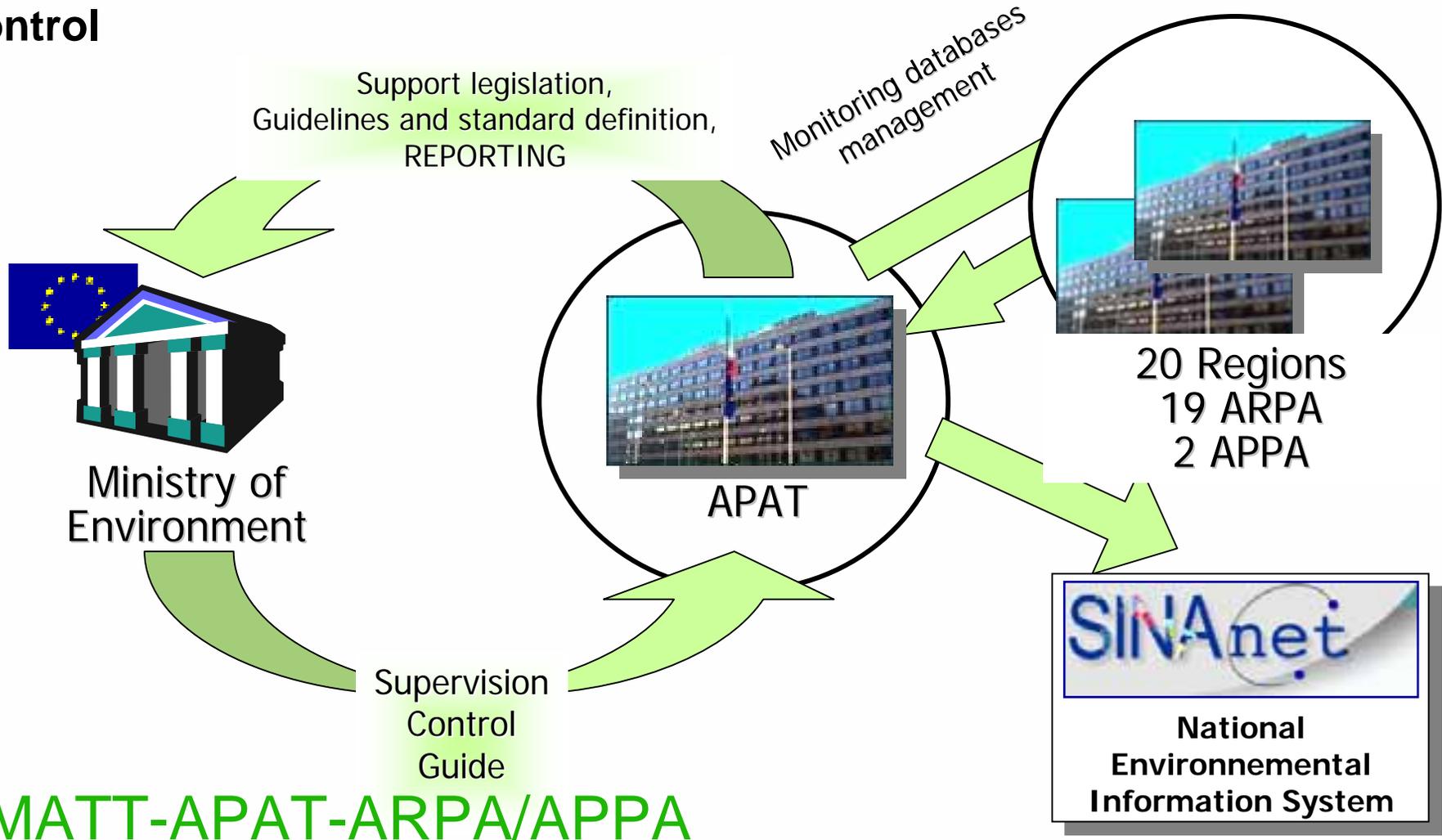
©EEA2004  
©ArcWorld  
©USGS1996  
©Eurostat  
©EuroGeographics  
©Collins & Barlow Limited 1998

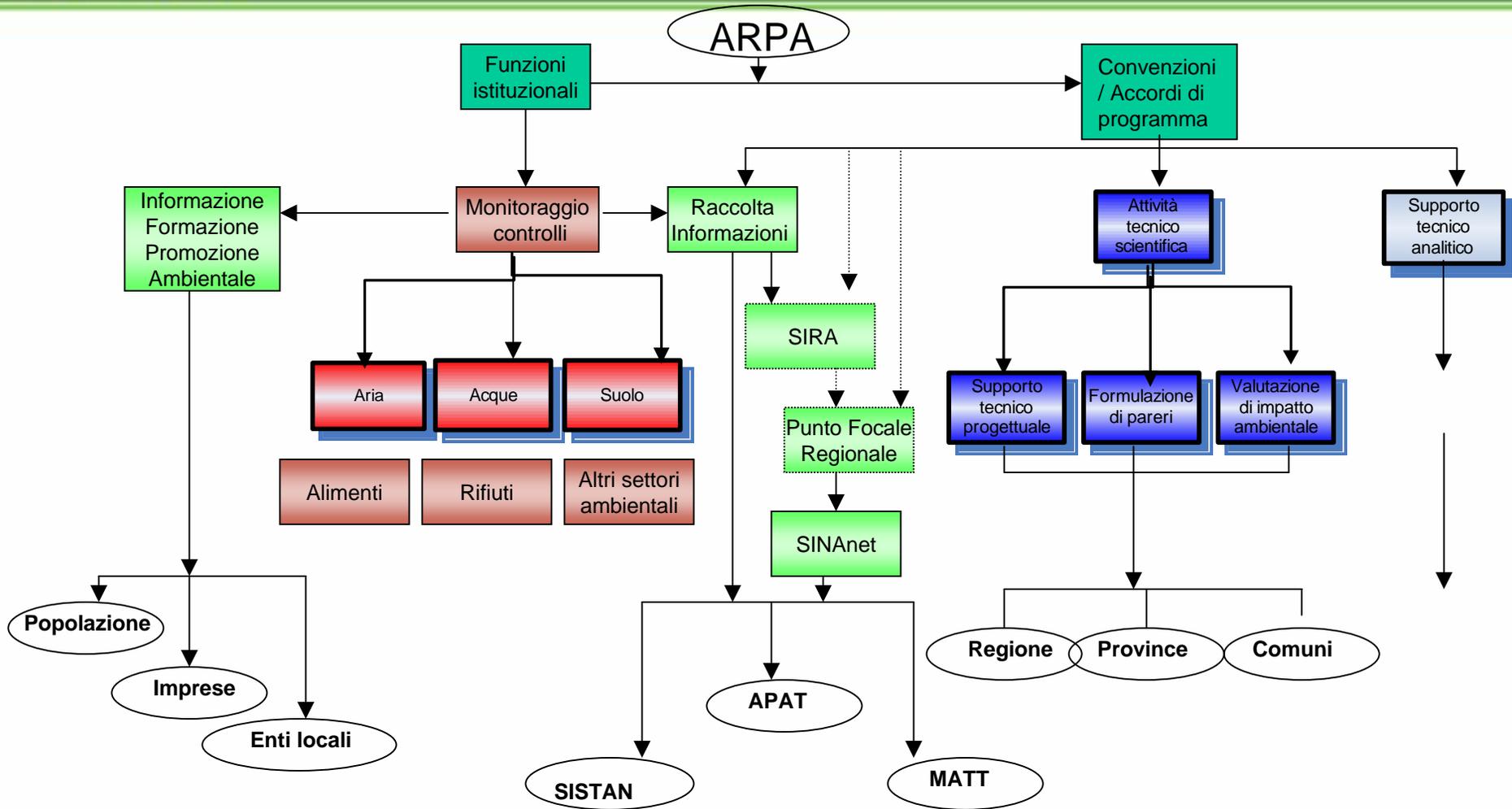
Operazione completata

Start | EEA - EPER service... | Floppy da 3,5 pollici... | Microsoft PowerPoint | 18.42

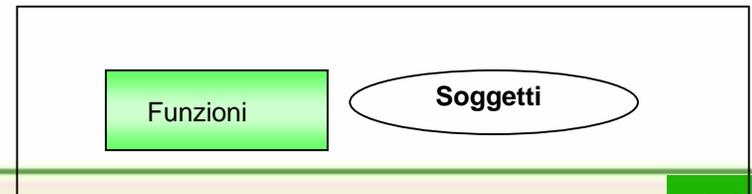
### 3. Monitoring

## Environmental Protection Agencies: collection of data, monitoring and control





SIRA, PFR Queste funzioni per metà delle regioni non sono in ARPA ma in Regione



### 3. Monitoring



National  
Environmental  
Information System

## SINAnet and environmental reporting

### REGIONS

SIRA : Regional Information System

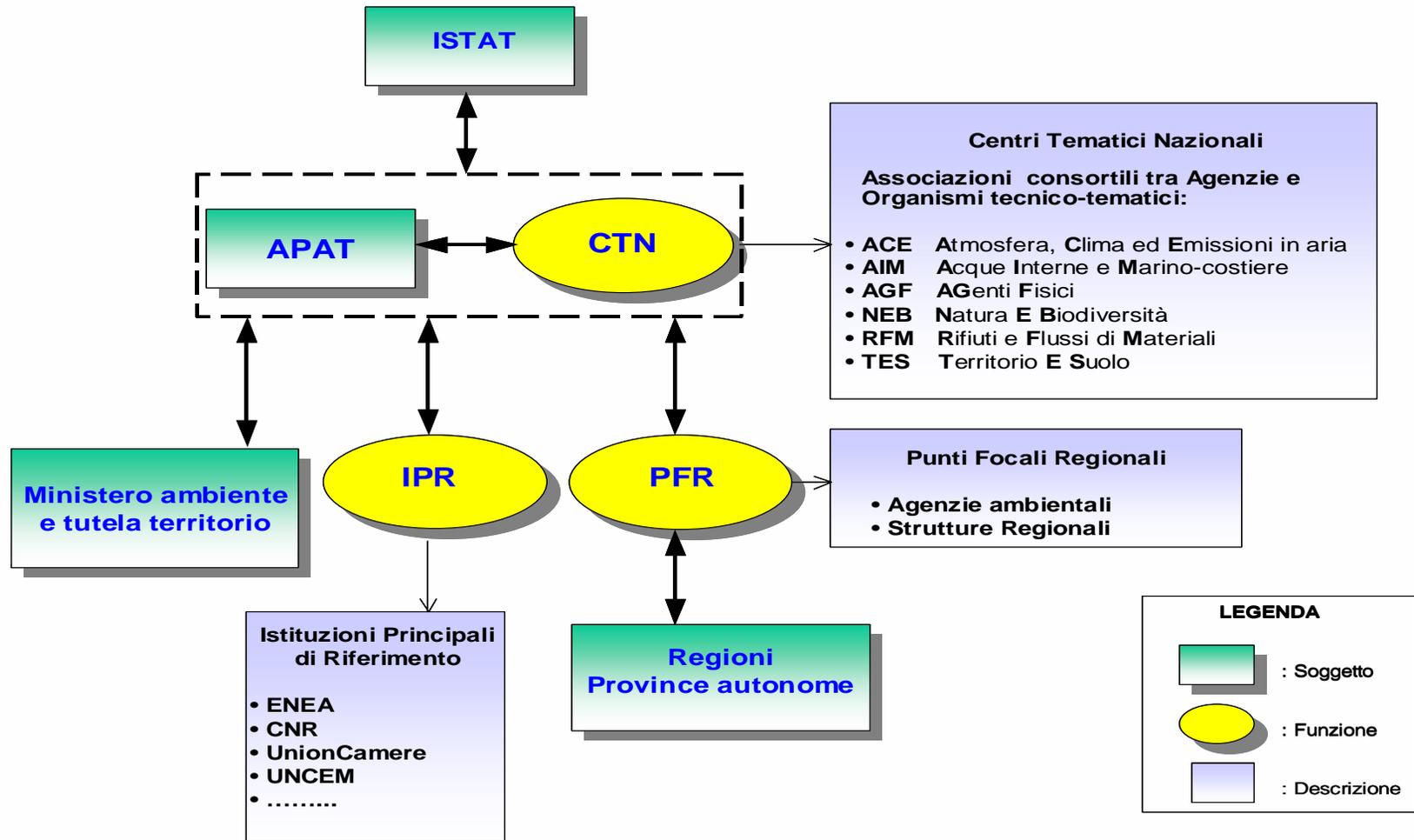
PFR: Regionaux Focal Points

Regionales and Provincial Agencies



### 3. Monitoring

## The SINAnet network



## 3. Monitoring

### Indicators (152/99)

- Temperature
  - Conductivity
  - Transparency
  - Flow
  - Oxygen
  - BOD<sub>5</sub>
  - COD
  - Nitrites
  - Nitrates
  - Ammonia
  - Phosphorus total
  - Ortho-phosphate
  - Chlorophylle "a"
  - *Escherichia coli*
  - Fecal coliformes
  - EBI (Macroinvertebrates)
  - TRIX (coastal eutrophication index)
- Rivers: >200 km<sup>2</sup>/400 km<sup>2</sup>
- Lakes: >0,5 km<sup>2</sup>

## 3. Monitoring

### Search for new indicators

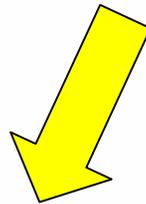
- Driver/Pressures/State/Impact/Response
- anthropic factors with an influence upon water quality
- Descriptive indicators required by national/international conventions
- Evaluation
- Drafting guidelines

## Other indicators

- Alcalinité
- Anoxie
- Activités productives
- Azote total
- Bicarbonates
- Bilan des éléments nutritifs
- Ca
- C<sub>org</sub>
- Flux de matière
- Flux en mer
- Cl et chlorures
- Composés organo-Sn
- Consommation de produits phytosanitaires
- Diatomées
- Dynophycées
- Dioxines
- Dureté
- Entérocoques
- Fe
- Phytoplancton
- Flottille de pêche
- Granulométrie
- IBE (Macroinvertébrés)
- Hydrocarbures Aromatiques Polycycliques
- Hydrocarbures Aromatiques Polycycliques dans les organismes
- Index d'anoxie
- Index hydrochimique des eaux souterraines
- SAAS
- SACA
- SAL
- SEL
- SquAS
- TSI
- TRBIX
- Résidences pres de rejets dangereux dans les eaux
- Niveau piézométrique

- Mg, Mn, As, Cd, Cr, Cr(VI), Cu, Hg, Pb, Zn
- As dans les organismes
- Cd dans les organismes
- Cr dans les organismes
- Cu dans les organismes
- Hg dans les organismes
- Ni dans les organismes
- Pb dans les organismes
- Zn dans les organismes
- Pêche
- Pesticides chlorurés
- Pesticides chlorurés dans les organismes
- pH
- Pisciculture
- PCB dans les organismes
- PCB dans les sédiments
- Débit
- K
- Salinité
- rejets/décharges
- Décharges après épuration
- Na
- Sulfates
- Matières en suspension
- Solvants chlorurés
- Sources d'éléments nutritifs
- Sol cultivé
- Test de bioluminescence
- Test de croissance algale
- Test de mutagénicité
- Test de toxicité
- Utilisation du sol

## 4. Combined Approach



Definition of  
 Environmental Quality Standards  
 (water, sediment, biota)

### **Emission control:**

- Best Available Technologies
- Emission limits
- Good environmental practices

## 4. Combined Approach

### Measures to reduce the impact of dangerous substances onto waterbodies

- Application of Best Available Technologies
- Definition of emission limits
- Interdiction of application and sale
- Good Environmental Practices (pesticides)
- Substitution with less dangerous substances
- Reutilisation of treated wastewater

## 4. Combined Approach

**Tools for ensuring/improving implementation and compliance  
(available to the Commission):**

1. Information exchange (workshops, ...)
  2. Develop common understanding  
(e.g. informal guidance documents)
  3. Promotion of best practices
  4. Link to financing instruments
  5. Reporting – informal (WISE)
  6. Political or public pressure
- 
- Common Implementation Strategy**
7. Publication of implementation reports  
- (first report March 2007)
  8. (Legally binding) Guidelines (incl. reporting) adopted in the Art 21  
Committee – not used (yet)
  9. Legal proceedings (Art. 226 and 228 – Treaty)  
– some non-communication cases ongoing but not used extensively (yet)

## 4. Combined Approach

- Reporting is not a purpose in itself – it is a tool to enable the fulfilment of various tasks  
(e.g. information of the public, assessment of compliance and policy effectiveness)
- Reporting is less important if WFD is implemented correctly and if environmental objectives are achieved
- Reporting becomes increasingly important if WFD is NOT implemented correctly and if environmental objectives are NOT achieved
- If reports are not available or not good enough, there is always the suspicion of “wrong doing” or “hiding”

## 4. Combined Approach

- Commission is mandated to check implementation by Treaty, MS shall provide all necessary information to enable the Commission to fulfil this task (Art 10)
- Commission can only check that transposition and implementation in consistent with the WFD (1:1 – implementation) – MS can go beyond (Art. 176 Treaty)
- Commission must ensure comparability of implementation between RBMP and consistency with WFD of individual RBMP