Biodiversity and EEA

From Monitoring to Knowledge on Biodiversity in Europe – Some thoughts and challenges

Jock Martin

European Environment Agency

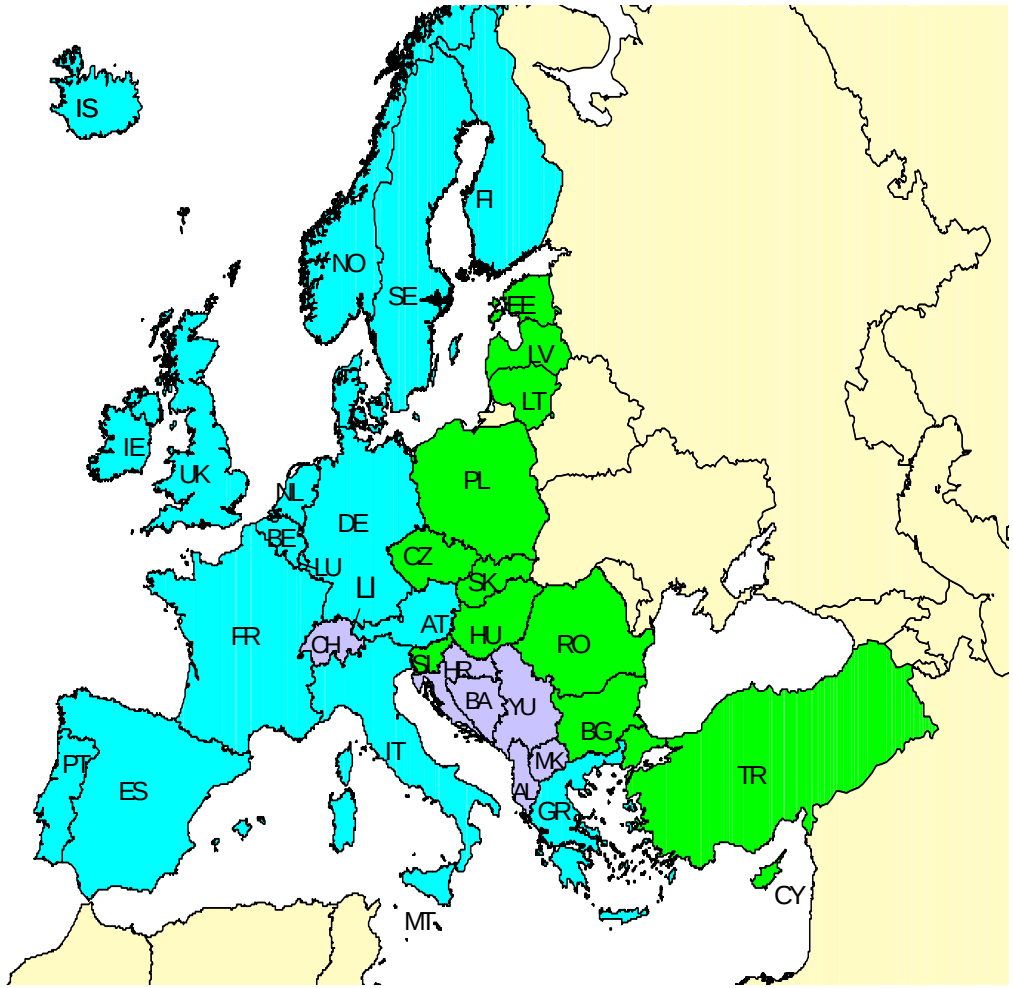
Copenhagen

Denmark

EEA Mission Statement

EEA aims to support sustainable development and to help achieve significant and measurable improvement in Europe's environment, through the provision of timely, targeted, relevant and reliable information to policy-making agents and the public

EEA members and other countries cooperating with EEA

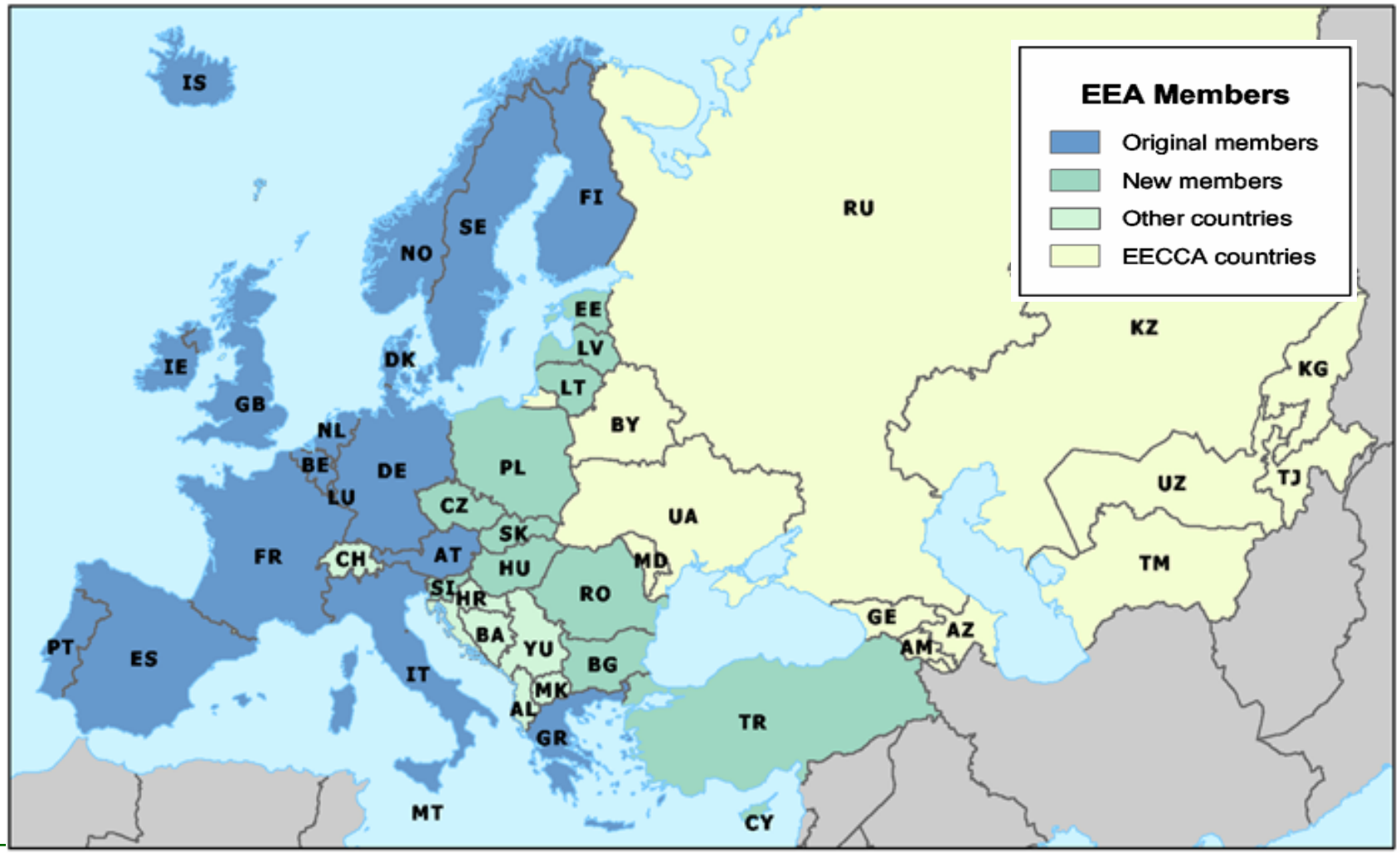


Original members

New members 2001-02

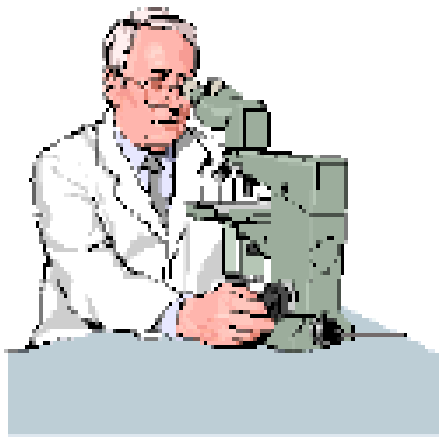
Other countries cooperating closely with EEA

EEA Pan-European Cooperation



EEA as a Boundary Organisation

Connecting best science and policy-making



Everything connects

”When we try to pick out anything by itself, we find it hitched to everything else in the Universe”.

John Muir, 1911

M D I A K

From monitoring….

….to knowledge

MDIAK stands for:

M: Monitoring

D: Data

I: Information

A: Assessment

K: Knowledge

K: Knowledge

A: Assessment

I: Information

D: Data

M: Monitoring

MDIAK is thus also:

K: Knowing needs of the clients

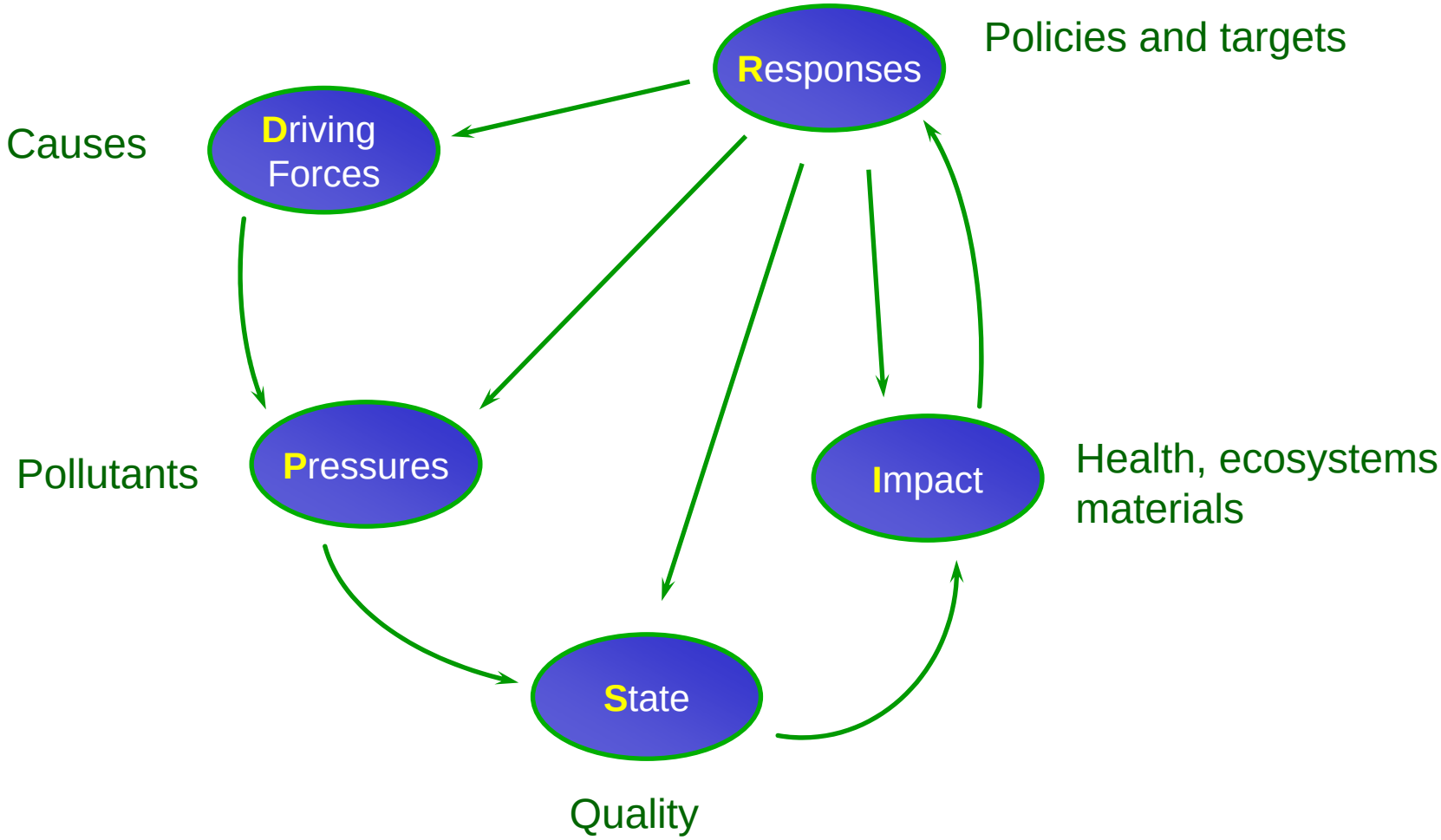
A: All available knowledge

I: Indicators to communicate

D: Data that are needed for that

M: Mobilising and supporting countries

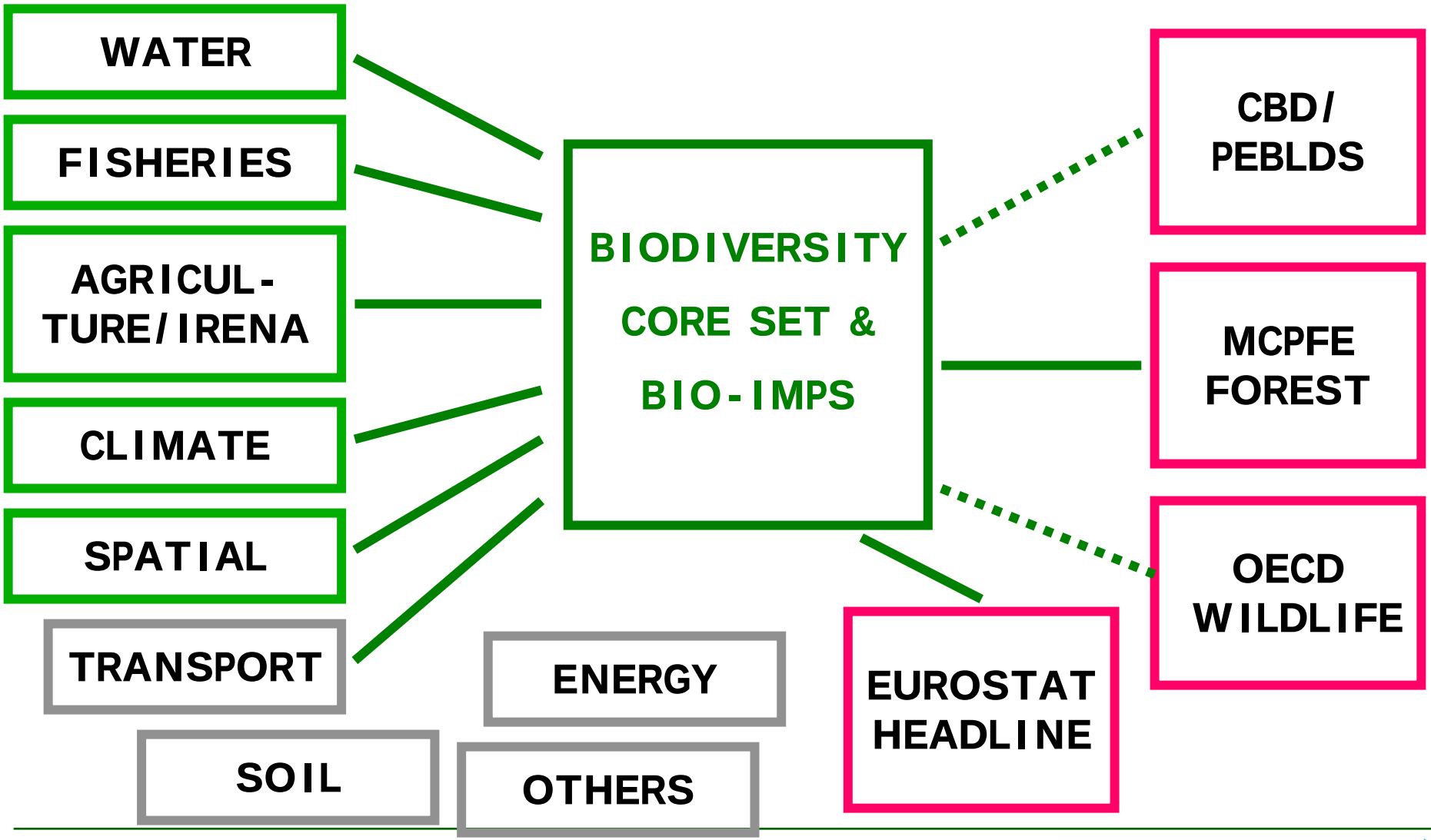
DPSIR causality chain



Environmental issues and related sectors

- **Environment issues**
  - –Air pollution
  - –Climate change
  - –Water Stress
  - –Nature/Biodiversity
  - –Terrestrial environment
  - –Waste/material flows
- **Sectors**
  - –Transport
  - –Energy
  - –Agriculture
  - –Tourism
  - –Fisheries
  - –*Industry*
  - –*Households*

Biodiversity indicators – relations among EEA indicators



EEA core set of indicators

	SHORT TERM	MID TERM	LONG TERM	ALL NOW
AGRICULTURE	15	13	7	**35**
AIR POLLUTION	14	8	1	**23**
BIODIVERSITY	30	21	3	**54**
CLIMATE CHANGE	25	9	1	**35**
ENERGY	31	-	-	**31**
FISHERY	7	6	16	**29**
OZONE	4	-	-	**4**
TERR ENVIRONMENT	5	11	3	**19**
TOURISM	14	1	16	**31**
TRANSPORT	25	10	1	**36**
WATER	13	18	11	**42**
WASTE/MATERIAL FLOWS	7	7	10	**24**
All	190	104	69	**363**

EEA Environmental Signals
OECD criteria for indicator selection

Policy relevant:

- representative
- simple, easy to interpret, trends over time
- responsive to changes
- basis for international comparisons

Analytically sound:

- well founded in technical and scientific terms
- based on international standards
- can be linked to models and information systems

Measurable at a reasonable cost/benefit ratio

Biodiversity

This star, our own good earth, made many a successful journey around the heavens ere man was made, and whole kingdoms of creatures enjoyed existence and returned to dust ere man appeared to claim them. [Man] too may disappear without any general burning or extraordinary commotion whatever.

John Muir 1916

Biodiversity policy

United Nations

- UN Biodiversity Convention

European Union

- Sustainable Development Strategy
- Community Biodiversity Strategy and Action Plans
- Sixth Environmental Action Programme
- Habitats/Birds Directive

6th Environmental Action Programme
(from overall aims in Art. 2)

*"Protecting, conserving, restoring and developing the functioning of natural systems, natural habitats, wild flora and fauna with the aim of **halting** desertification and the **loss of biodiversity**, including diversity of genetic resources, both in the European Union and on a global scale."*

6th Environmental Action Programme
(from Art. 6 objectives to pursue overall aims)

*"**Halting biodiversity decline** with the aim to reach this objective by 2010, including prevention and mitigation of impacts of invasive alien species and genotypes."*

Halt biodiversity decline by 2010 – what does this include?

- Extinctions?
- Permanent loss through migration?
- Temporary loss through changes/cycles in conditions?
- Reduction in variety of (different types of) organisms (i.e. reduction in variation)?
- Reduction in the quality/fitness of (different types of) organisms and eco-systems (i.e. degradation or degeneration)?

Policy questions for developing indicators

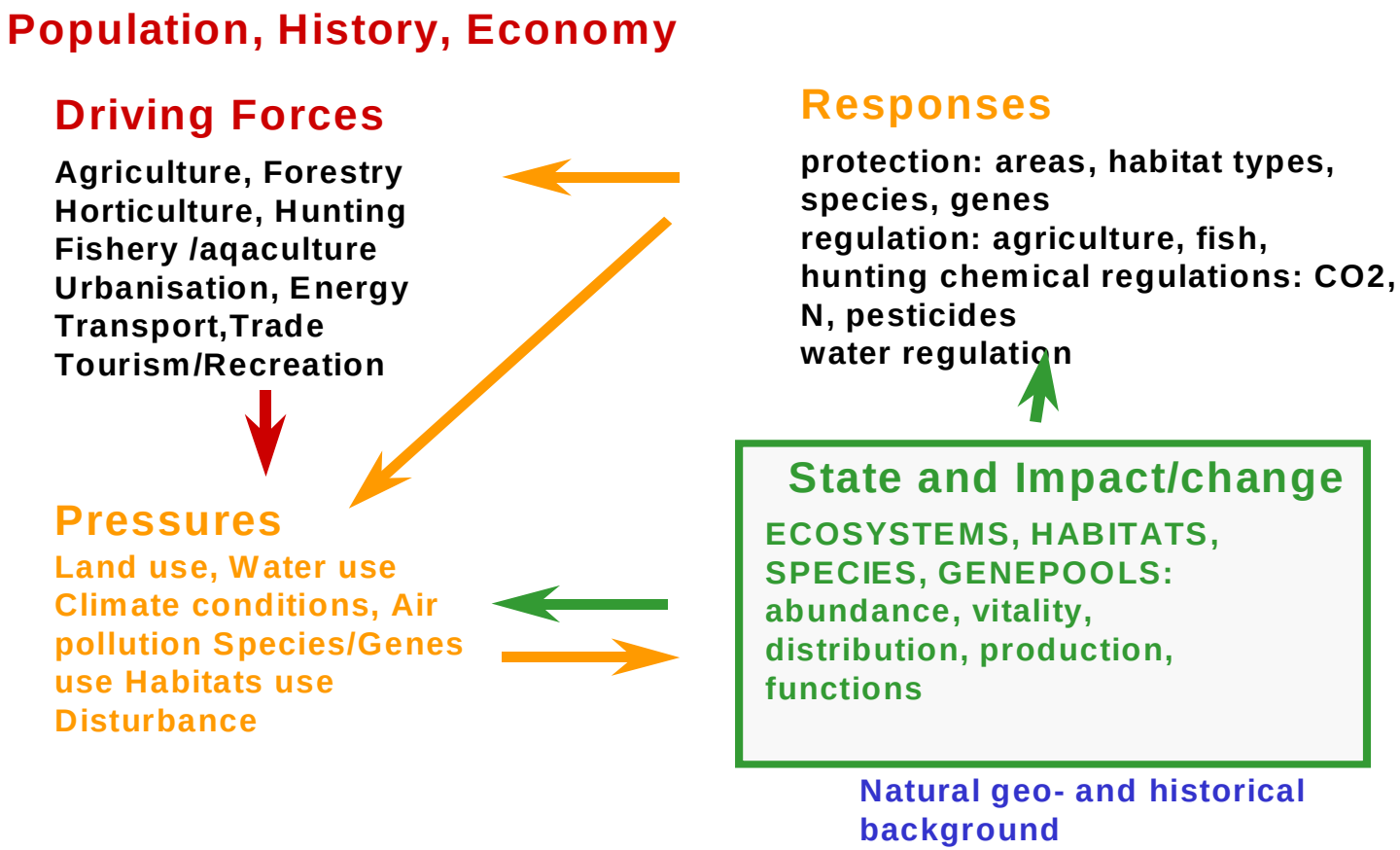
Policy questions as defined by EEA guidelines

1. How is the issue developing? (distance to target, decoupling etc)
2. How are sectors/actors/ processes contributing?
3. How are impacts developing?
4. How effective is the response?

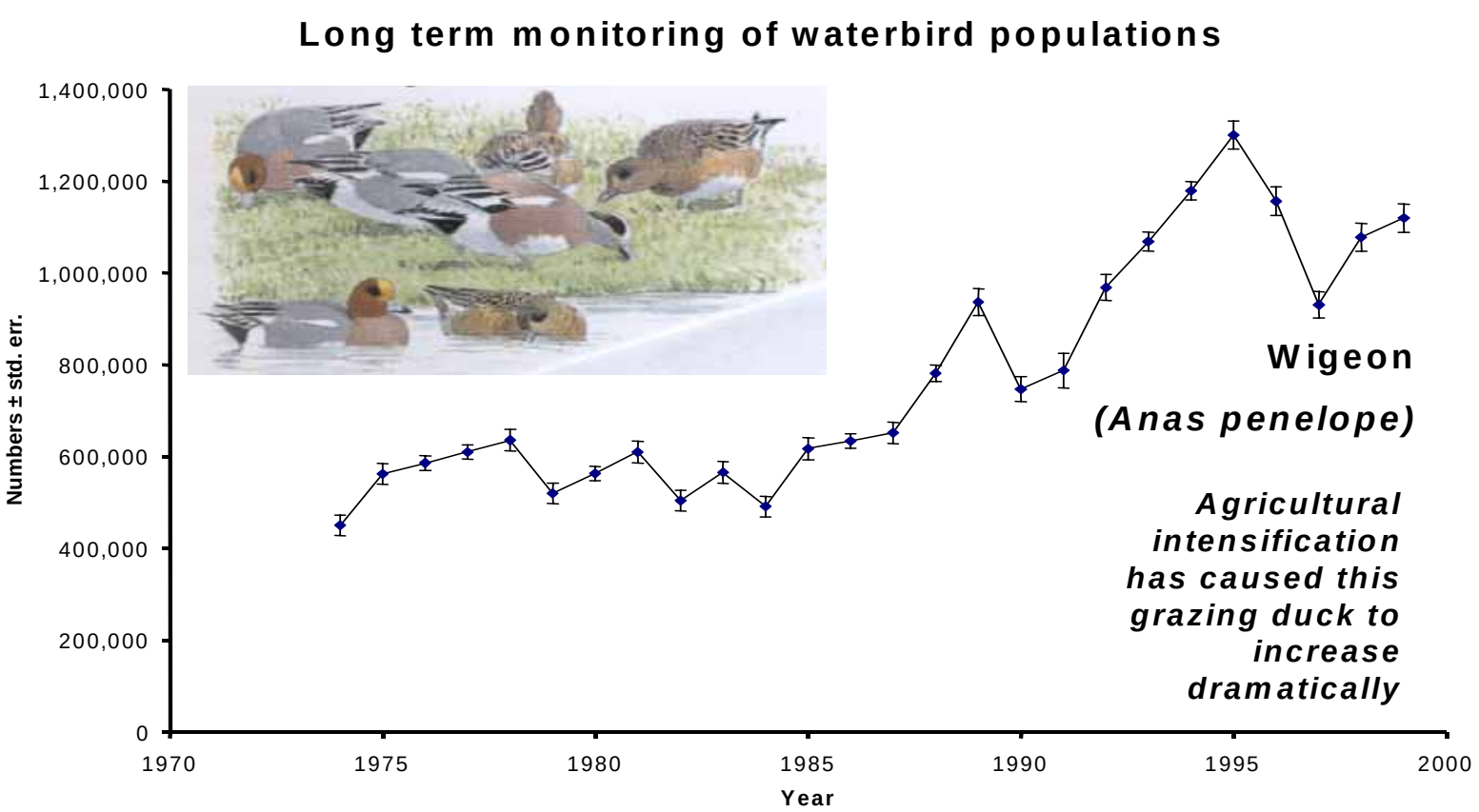
Adapted to Nature and Biodiversity theme

1. What is the status and trends of Europe's Biodiversity?
2. How are sectors contributing to the pressures on Europe's Biodiversity?
3. What are the qualitative and quantitative impacts on Europe's Biodiversity?
4. Are measures taken to conserve or restore Europe's Biodiversity efficient?

DPSIR Framework for biodiversity



Example of good monitoring and data



Source: International Waterbird Census, Wetlands International

Timetable for biodiversity indicators

Specifications	2002
Strategy	2003
Design	2004
1st Sample collection	2005
Analysis/handling	2006
1st Data analysis	2007
1st Reporting	2008
Revise strategy/design	2009
2nd Sample collection	2010 = Baseline

European Platform for Biodiversity Research Strategy (EPBRS)

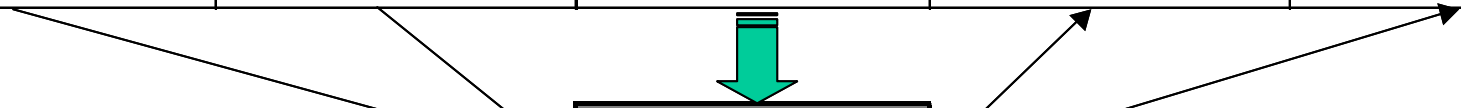
The Platform aims to improve the relevance of European biodiversity research to policy, and the use of science to underpin policies

- To promote discussion of EU biodiversity research strategies and priorities
- To exchange information on national biodiversity activities
- To disseminate current best practice and information regarding scientific understanding of biodiversity conservation

1. What happens, what is the distribution over space of the major threats on biodiversity?

Candidate indicator: CONFLICTS IN THE USE OF LAND

Driving forces	Pressure	State	Impacts	Responses
Agriculture	Extension of the broad pattern agriculture, regrouping of arable land	**Land cover state, artificiality/naturalness**	Impacts of conflicts in land use on landscape diversity	Land planning, integrated management
Urban development	Destruction of small landscape features (hedgerows, lanes, walls,	Content in small landscape feature	Impacts of conflicts in land use on the potential extention of habitats	Protection of biotopes
Transport	Land uptake by urban sprawl, transport infrastructures…	Areas with increase of urban development over natural land	Impacts of conflicts in land use against nature on economic activities	Agri-environmental measures
Tourism		Areas with increase of broad pattern agriculture against pasture and mixed agriculture	Impacts of conflicts in land use against nature on amenities, scenery values	
		Areas with increase of broad pattern agriculture against natural habitats		



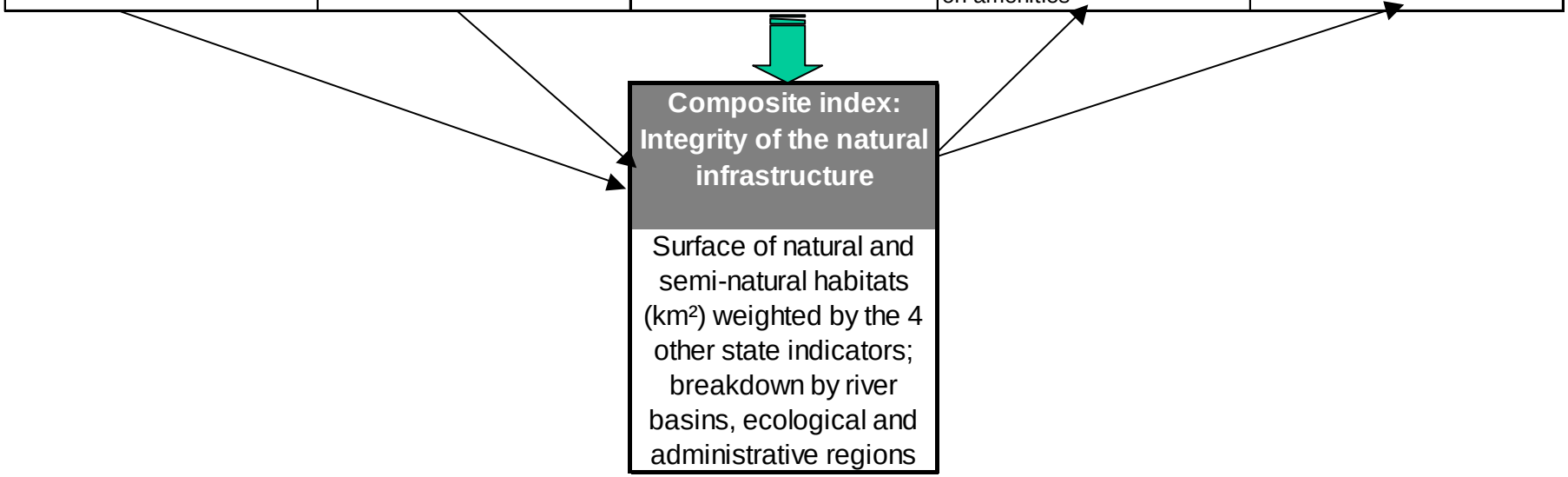
Composite index: Conflicts in the use of land

Land cover (km^2) weighted by an artificiality/naturalness index and the 4 other state indicators; breakdown by river basins, ecological and administrative regions.

2. How is the functioning of the ecosystem at the meso and macro levels?

Candidate indicator: INTEGRITY OF THE NATURAL INFRASTRUCTURE

Driving forces	Pressure	State	Impacts	Responses
Development of transport infrastructure	Partitionning of land	**Extension of natural and semi-natural habitats**	Natural regeneration of the habitats, surface and potentials	Impact assessment
Development of broad pattern agriculture	Fragmentation of forests	Potential connectivity of habitats/ land Potential connectivity of habitats/ river corridors	Change in the spatial distribution of species	Land planning
	Fragmentation of natural biotopes	Integrity of biotopes, specific size	Long term impacts of the change in the functioning of the ecosystems on the economic activities	Agriculture policy
	Land uptake by urban and transport development	Migratory flows (routes and magnitude)	Impacts of the change in the functioning of the ecosystems on amenities	



3. What are the trends of the main equilibrium masses over the territory? Forests potentials

Candidate indicator: FORESTS BIOLOGICAL POTENTIALS

Driving forces	Pressure	State	Impacts	Responses
Timber, wood products and paper production	Harvesting, incl. felling/thining practice	**Surface of forests (according to forests types, composition)**	Regional impact of the forests conditions on species abundance and composition	Forests protection
Energy production	Regeneration practice	Landscape patterns of the forests	Impact of the changes in forests conditions on the economic activity	Forests management best practices
Development of transport infrastructure	Introduction of new species of trees	Changes in species composition of forests, trees and other species	Impact of the changes in forests conditions on amenities	Conservation of the genetic resources
Climatic events	Land use in and around the forests	Naturalness of forests/ age		Certification of trees
	Fragmentation of forests by roads	Naturalness of forests/ introduced vs.endemic species		Valorisation of non-timber products and forests amenities
	Emissions to air	Forests affected by acid depositions		
		Forests health (crown conditions, deadwood, other…)		

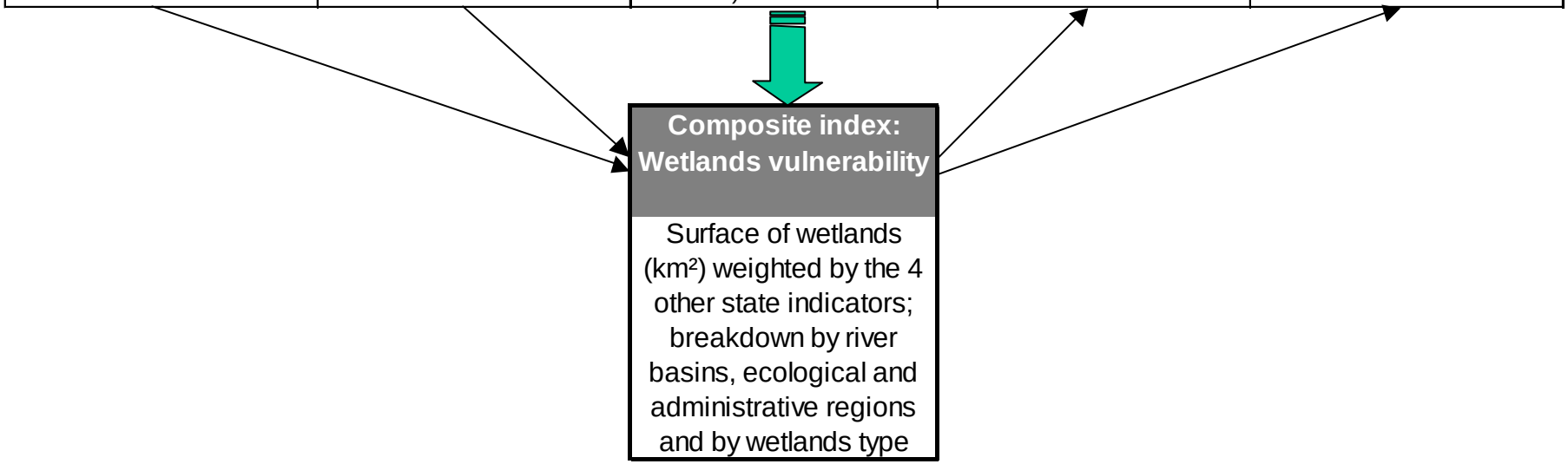
Composite index: Forests biological potentials

Surface of forests (km²) weighted by the 6 other state indicators; breakdown by forest, ecological and administrative regions and by forest type

4. What are the trends of the most sensitive areas over the territory?

Candidate indicator: WETLANDS VULNERABILITY

Driving forces	Pressure	State	Impacts	Responses
Agriculture	Drainage of wetlands	**Surface of wetlands**	Regional impacts of the wetlands conditions on species abundance and composition	Protection
Urban development	Soil sealing	Species composition of wetlands	Impact of the changes in wetlands conditions on the economic activity	Fiscal policies, subsidies
Development of transport infrastructure	Polluting emissions from basins	Eutrophication	Impact of the changes in wetlands conditions on amenities	Valorisation of amenities
Industrial/ storage and landfilling of toxics		Accumulation of toxic substances Wetlands health (distress indicators)		



5. What are the trends of the aquatic ecosystems?

Candidate indicator: ECOLOGICAL CONDITIONS OF THE RIVERS

Driving forces	Pressure	State	Impacts	Responses
Hydro-electricity production	Disruption of the natural course of the rivers by dams	**Hydrographic network integrity, by large, medium and small rivers**	Regional impacts on the ecological conditions of rivers and lakes on terrestrial biotopes and species	River basin management schemes
Development of recreational services	Modification of the natural hydaulic condition	Periodicity of water stress in rivers	Impacts on the ecological conditions of rivers and lakes on economic activities	Enforcement of the respect of the natural flows
Mis-management of the rivers	Water abstraction in summertime	Decrease in the fish stocks and composition	Impacts on the ecological conditions of rivers and lakes on amenities	Pricing policy of the use of water
Use of fertilisers and pesticides	Polluting emissions to water	Decrease in other aquatic fauna (benthic		Taxation of polluting emissions
Irrigation		Decrease in birds and mamals linked with the riverine biotope		
Seasonal use of water (tourism…)		Eutrophication		

Composite index: Ecological conditions of the rivers and lakes

Length of large, medium and small rivers (km) weighted by the integrity index and the 5 other state indicators; breakdown by river basins, ecological and administrative regions.

6. What are the mechanisms at work, which early signals, what is the long term efficiency of protection measures?

Candidate indicator: LONG TERM TRENDS IN PROTECTED AREAS

Driving forces	Pressure	State	Impacts	Responses
Agriculture	Vicinity of urban areas	**Number and extension of protected/ designated areas**	Long term sustainability of protected areas	Protection measures
Urban development	Vicinity of intensive agriculture	Habitats composition of protected areas	Efficiency of the protection of habitats for maintaining the overall biodiversity (species and non-protected biotopes)	Land planning
Transport	Vicinity of transport networks	Species composition of protected areas	Statut of theatened species	Agriculture policy
Tourism	Polluting emissions	Eutrophication		
	Use of GMOs	Intoxication	Impacts of nature protection on economic activities (agriculture, transport, urban development, tourism…)	
	Frequentation by tourists…	Genetic changes	Impacts of nature protection on amenities, scenery values…	

Composite index: Long term trends in protected areas

Protected/ Designated areas weighted by their surface (km²) and the 5 other state indicators; breakdown by river basins, ecological and administrative regions.

Biodiversity reporting obligations

Overview from EEA Reporting Obligations Database

- 14 International legislative instruments
- 49 reporting obligations
- 1700 questions

Biodiversity reporting obligations

Classification by purpose:

- Compliance (501)
- DPSI (634)
- Implementation (248)
- Effectiveness (104)
- Background (265)

New Reporting Framework

1. To check compliance (including legal transposition and practical implementation)
2. To assess state and trends in the environment in order to monitor progress
3. To evaluate policy effectiveness

New Reporting System Principles

•Less reporting, better quality

•Hence, need to find a better balance between types 1, 2 and 3:

- improved reporting on compliance
- better focus for SoE data (indicators)
- more reporting on effectiveness

•Core set of SOE data collection on a mandatory basis supplemented by new data flows on a voluntary basis linked to emerging policy priorities

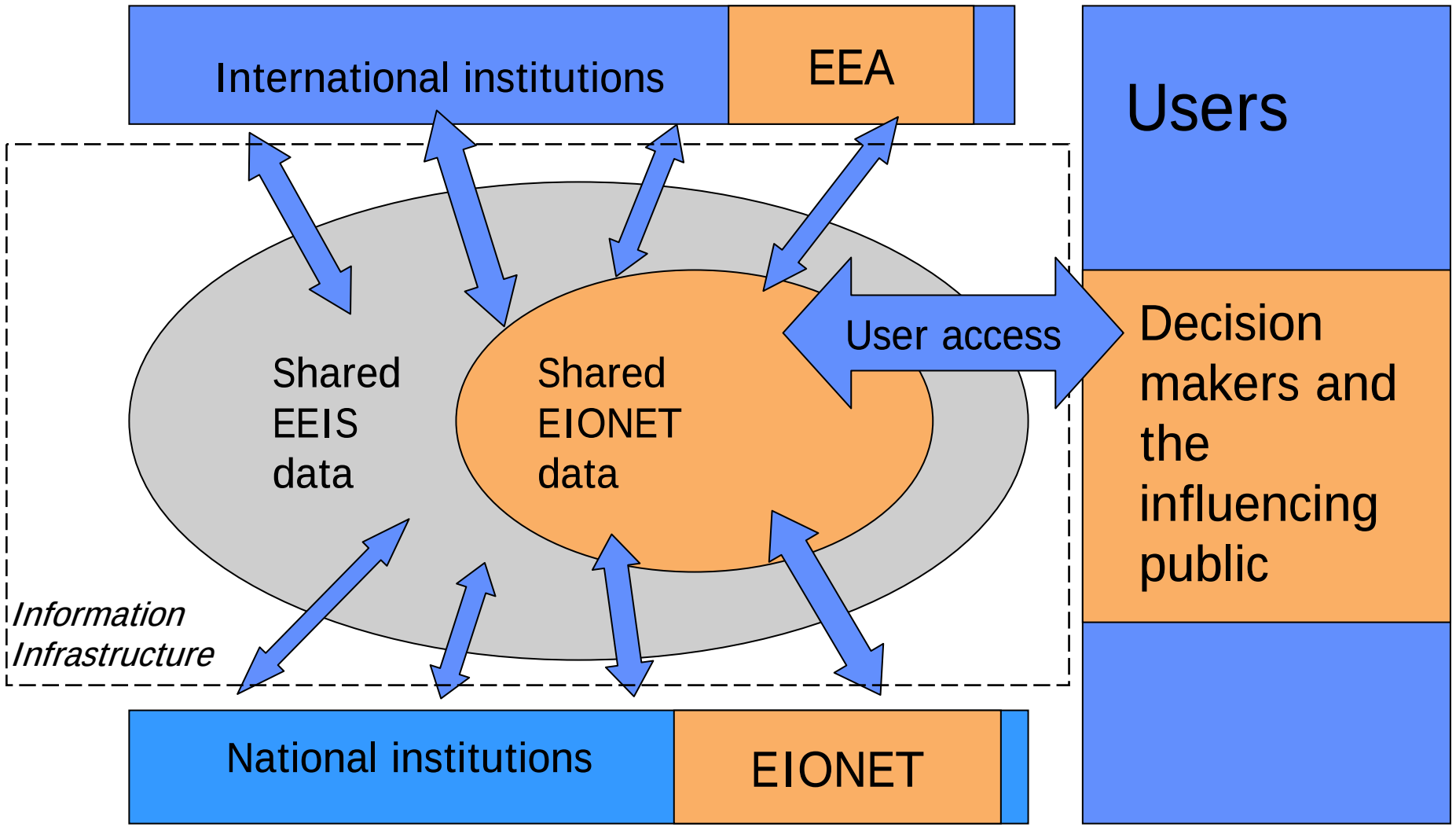
•Multi-use of same info for more than one purpose

•Shared Information System concept

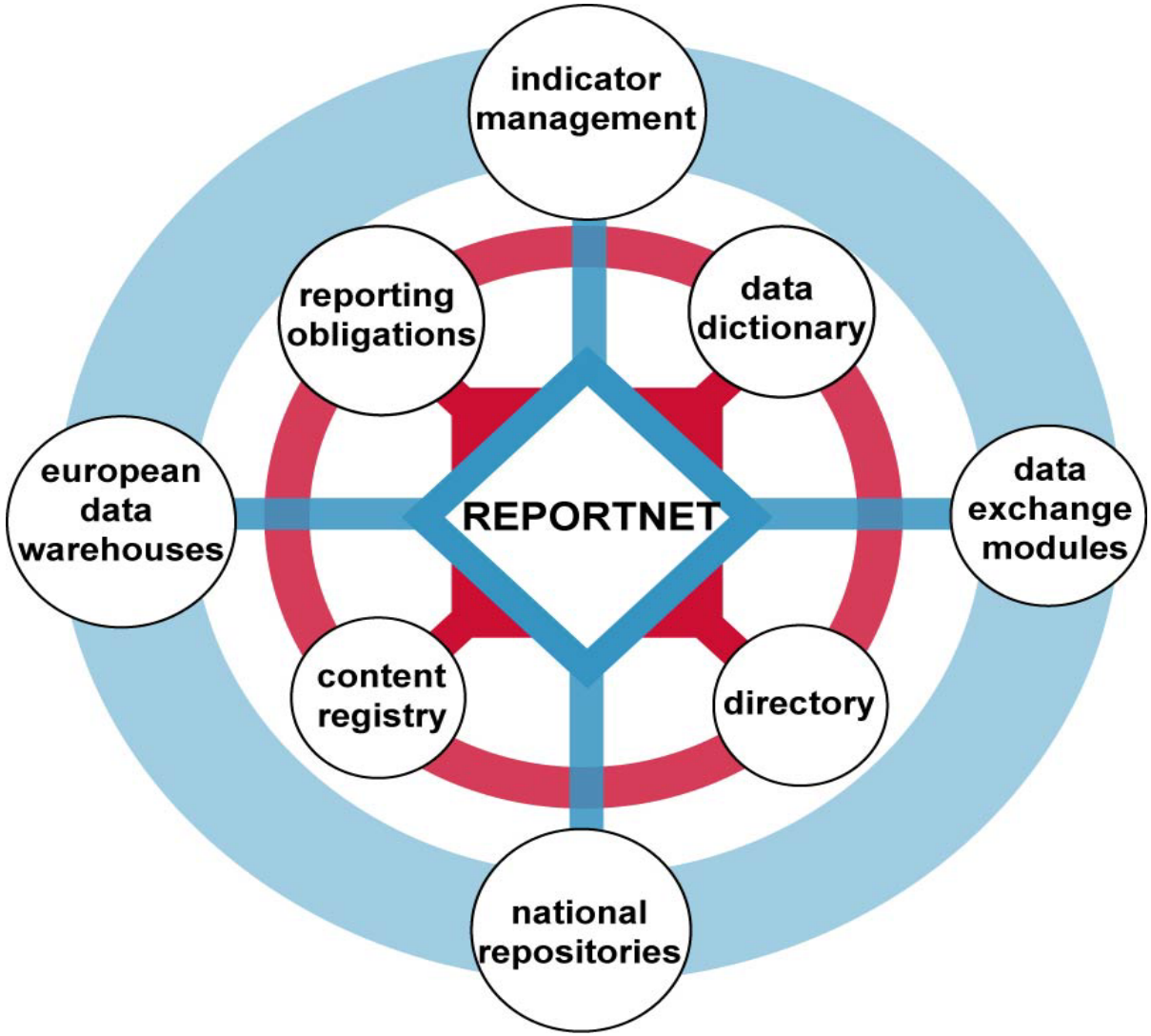
•Electronic reporting and public access - transparency

•From reporting system to information system??????

Elements of the European Environmental Information System



Reportnet – EEA tools for information flows



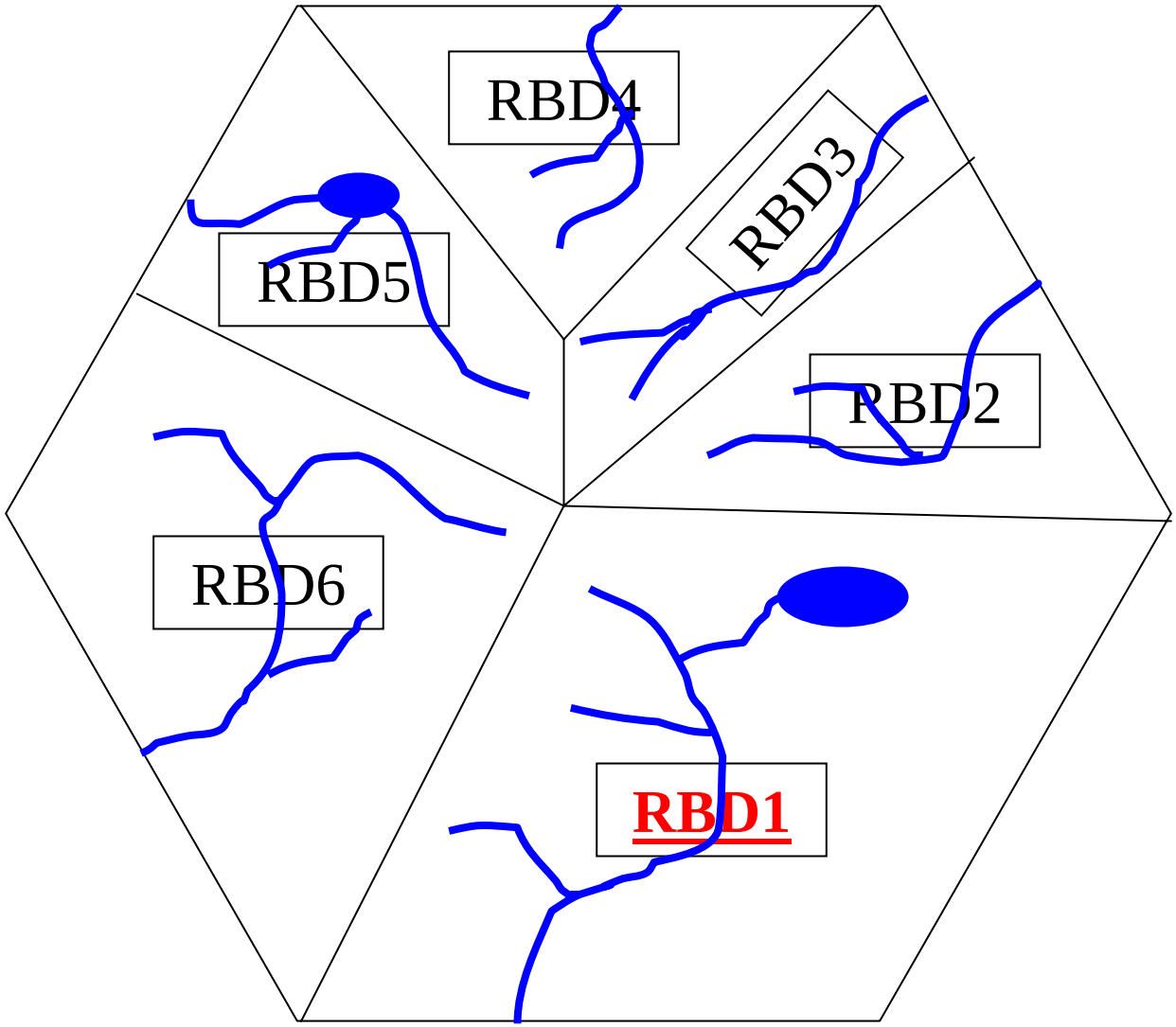
European Data & Information Management System For Water

(Country X)

-> Information on legislation and administrative provisions

-> Information & data on water

River Basin Districts – management unit of WFD

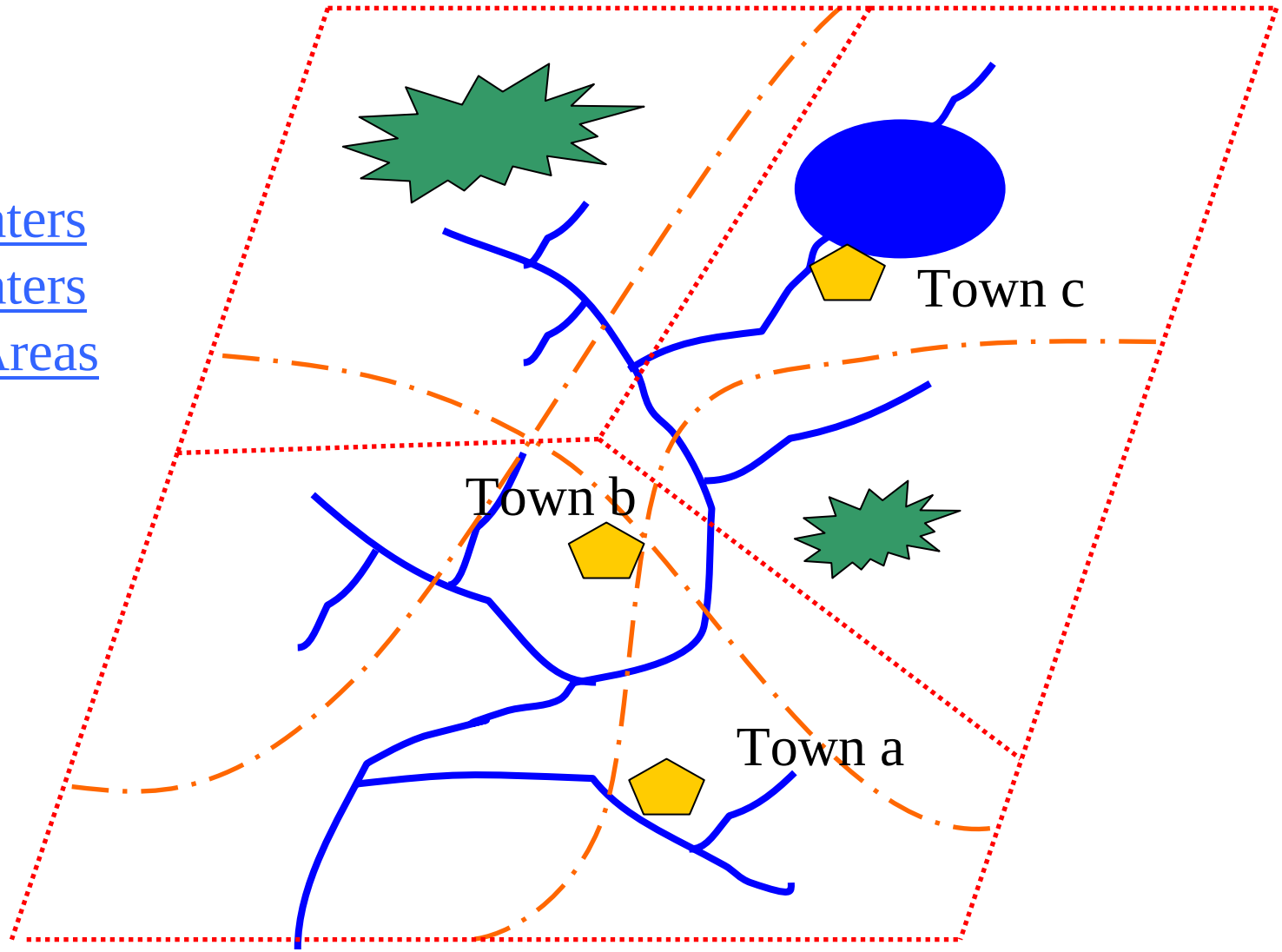


RBD - Information & Data Needs

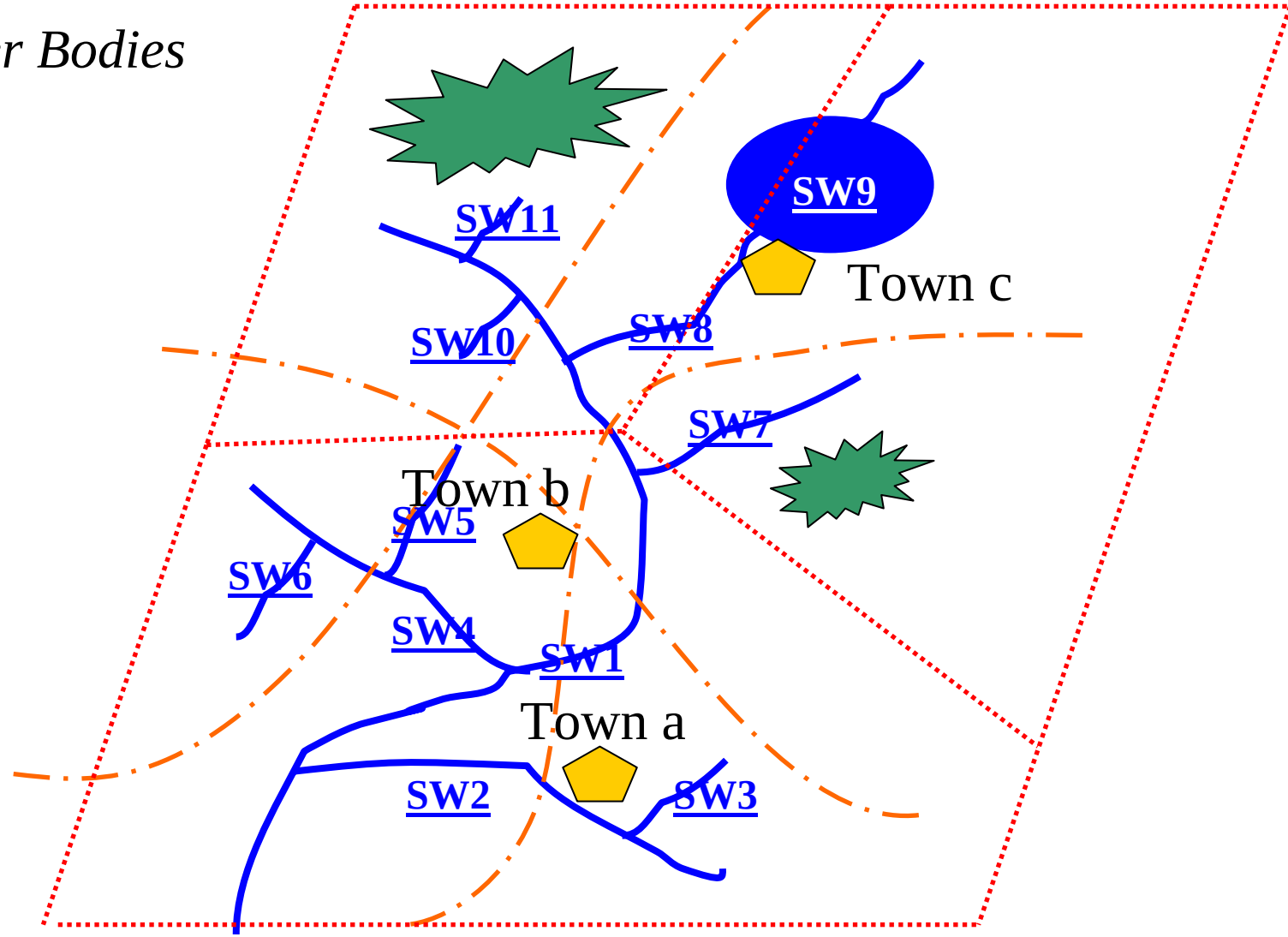
-> 1. Geographical coverage
-> 2. Competent Authorities
-> 3. Water Bodies
-> 4. Economic Analysis
-> 5. Programme of Measures
-> 6. Public Information / Consultation
-> 7. Contact points
-> 8. RBMP

1.3 Water Bodies

-> Surface Waters
-> Ground Waters
-> Protected Areas

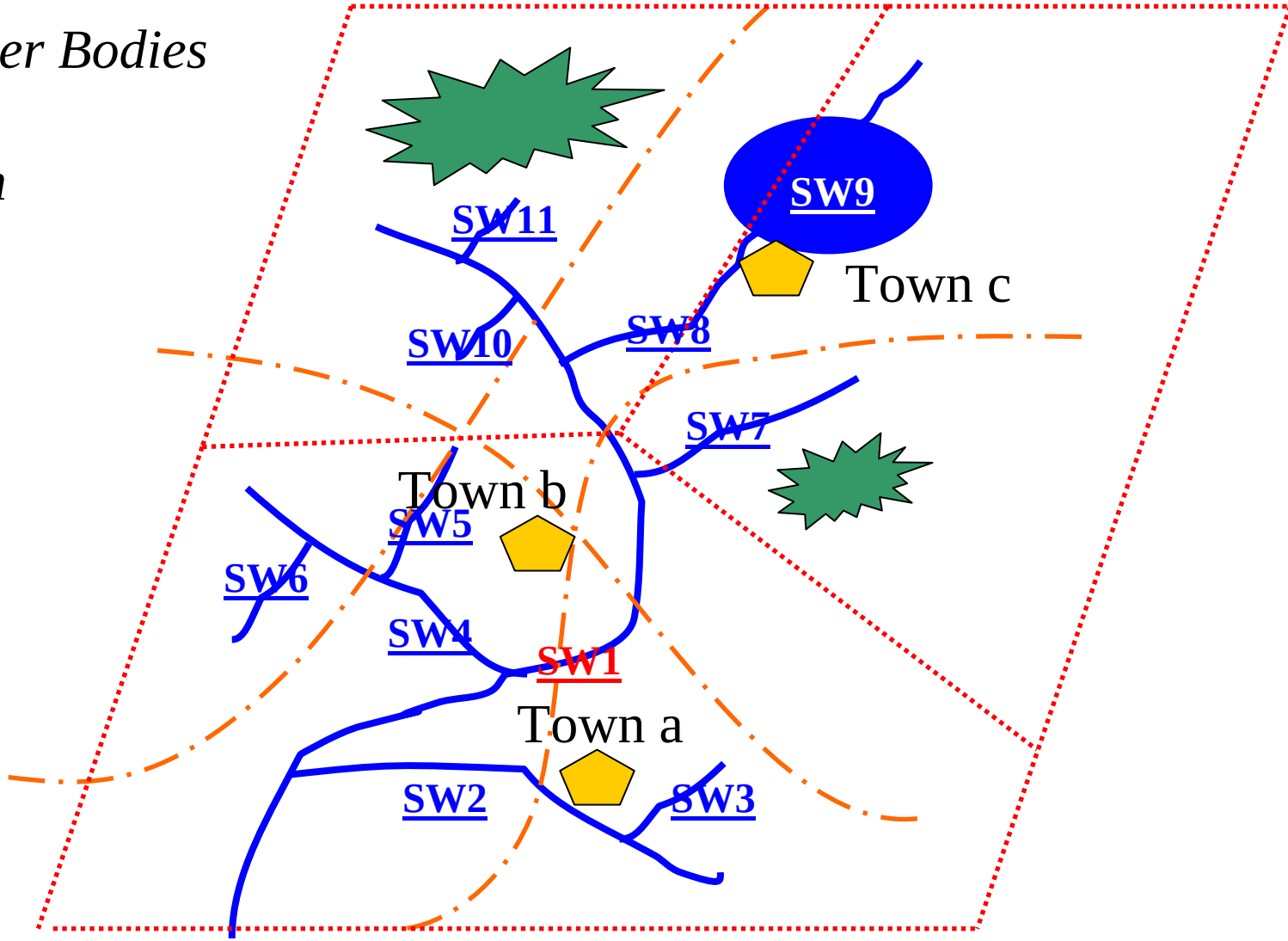


1.3.1 Surface Water Bodies



1.3.1 Surface Water Bodies

Selection



1.3 Water Bodies

1.3.1 Surface Water Bodies

SW 1

-> Characterisation ..... Map

-> Pressure / Impact ..... Text

-> Monitoring Network ..... Map

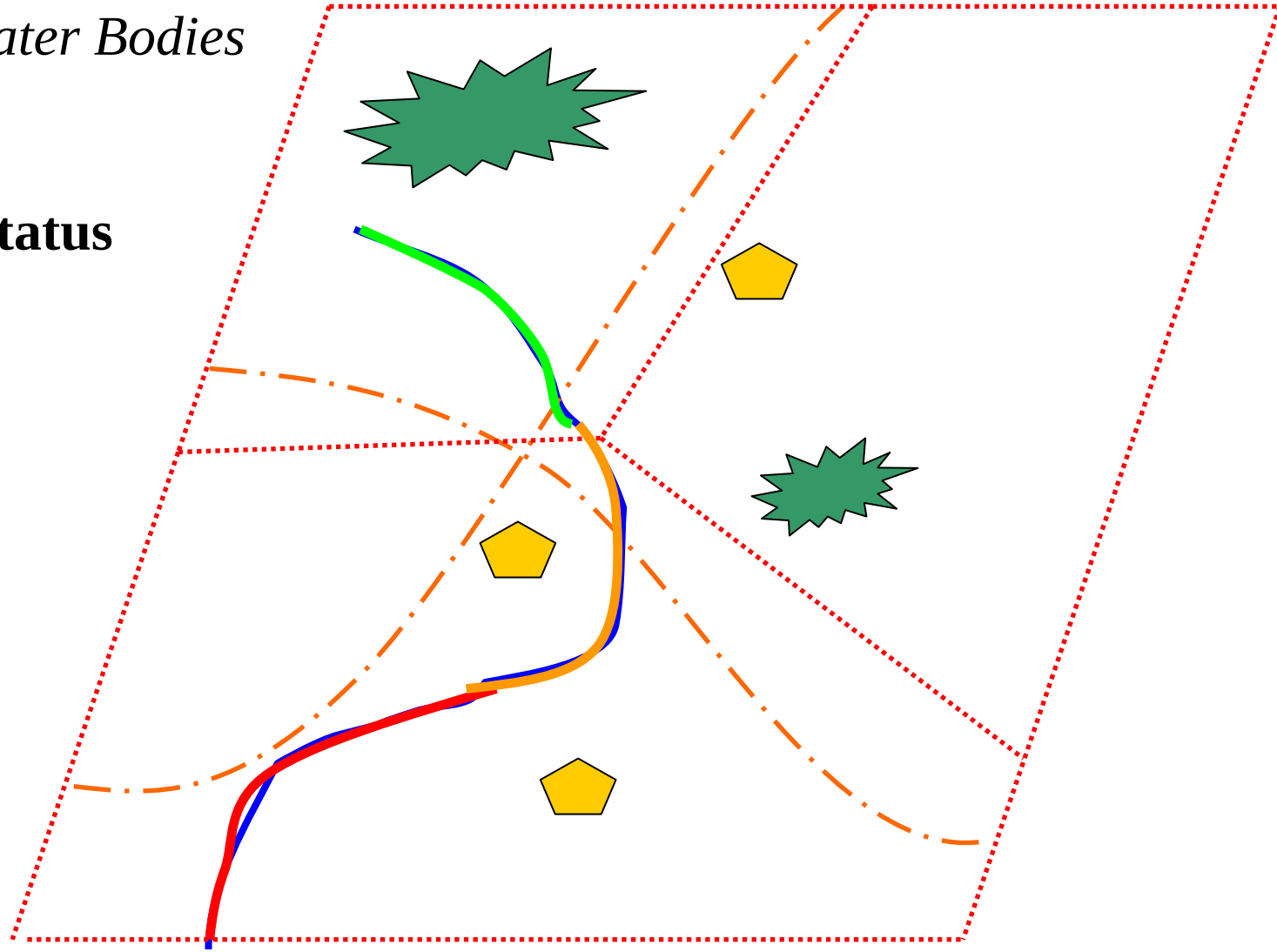
-> Ecological Status ..... Map

-> Chemical status ..... Map

-> Environment Objectives ..... Text

1.3.1 Surface Water Bodies
SW 1

Ecological Status

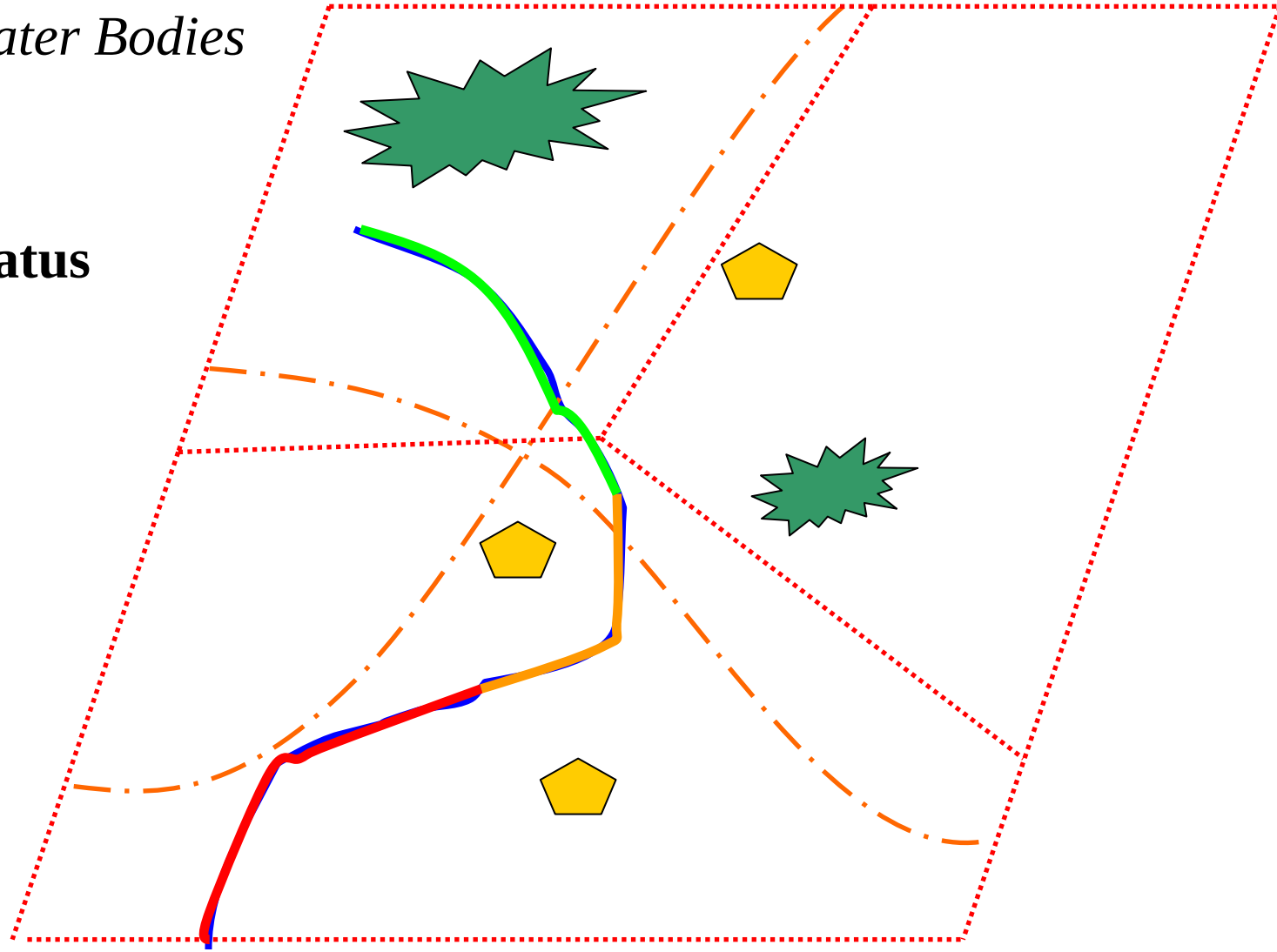


Map N° 7

European Environment Agency

1.3.1 Surface Water Bodies
SW 1

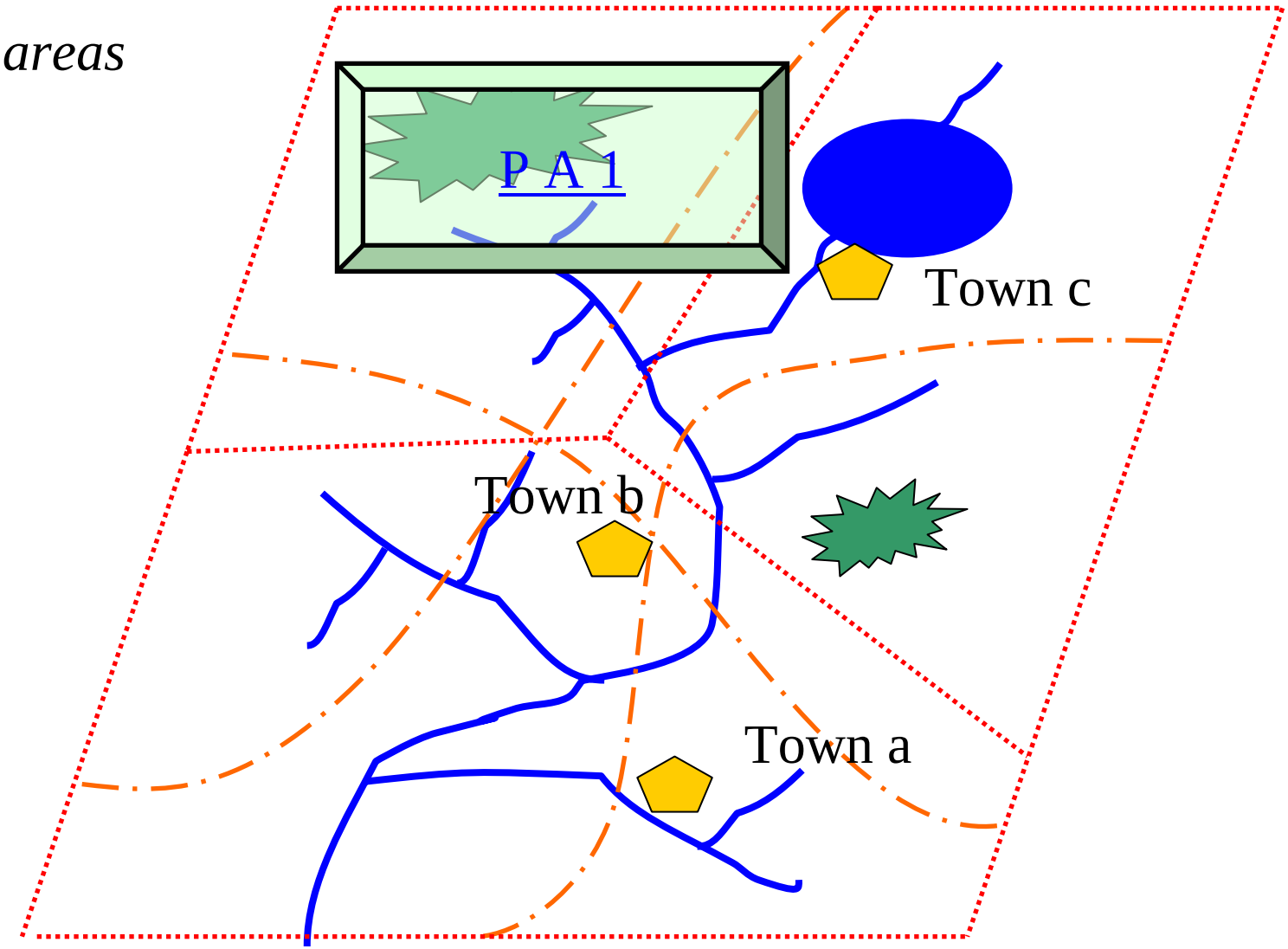
Chemical Status



Map N° 8

European Environment Agency

1.3.3 Protected areas



1.3.3 Protected areas

RBD1

-> 1.4 Economic analysis

-> 1.5 Programme of measures

-> 1.6 Public information/consultation

-> 1.7 Contact Points

-> 1.8 R B M P