

Sustainable Sediment Management according to SedNet

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Net**

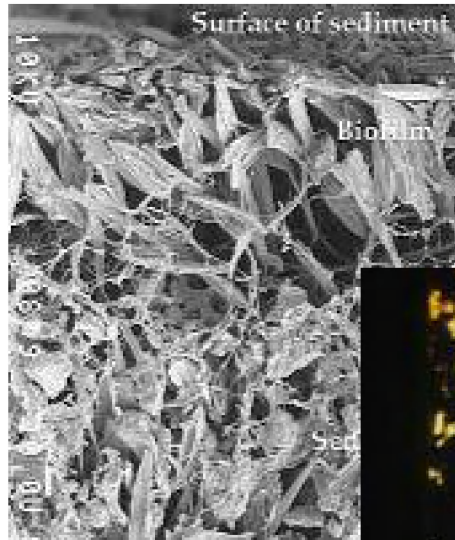


Outline

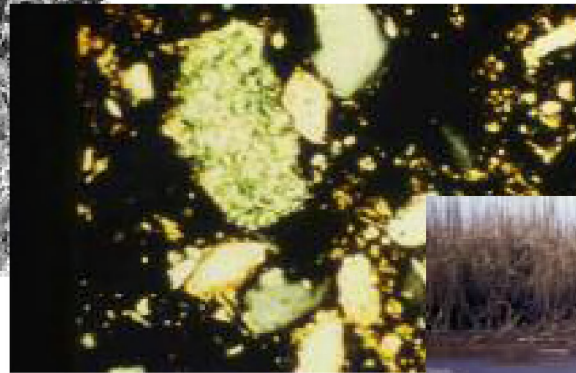
- Sediment
- Sediment threats and their impacts
- Sediment management and European policies
- Changing perspective on sediment management
- Conclusions and recommendations



Sediment looks fascinating...



through electron
microscope



through light
microscope

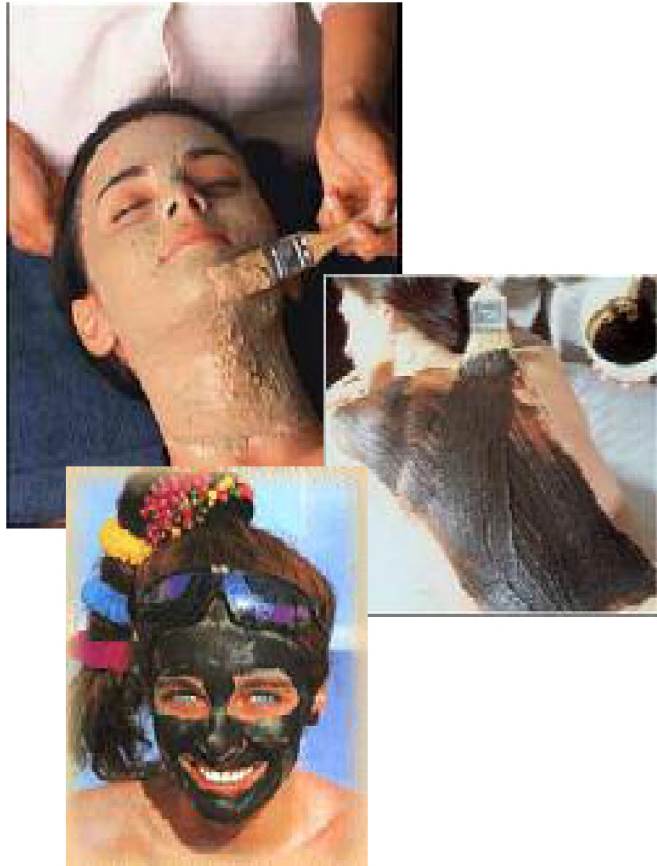


in the field

from the air



...makes you beautiful...

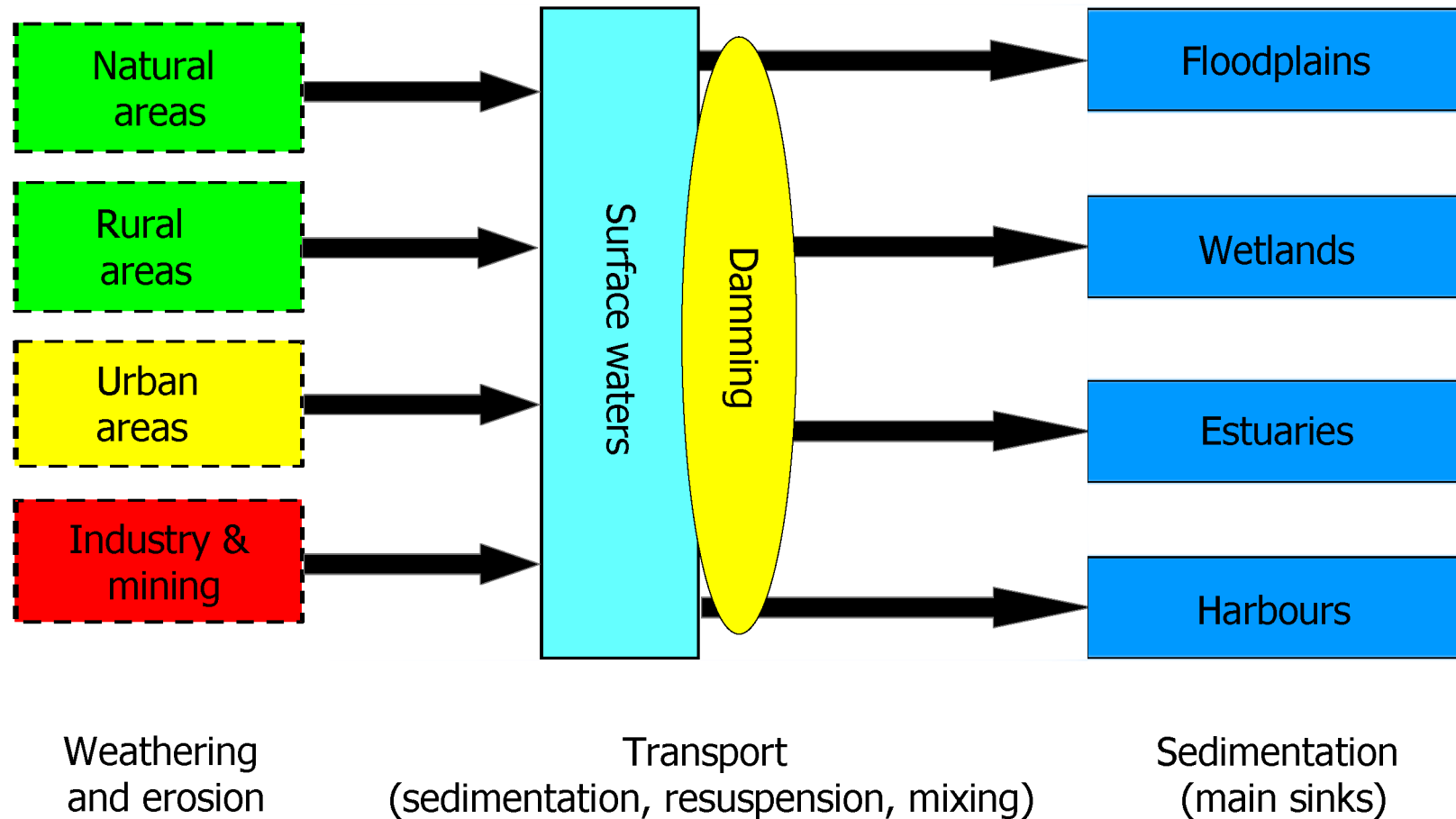


...and it feels great!

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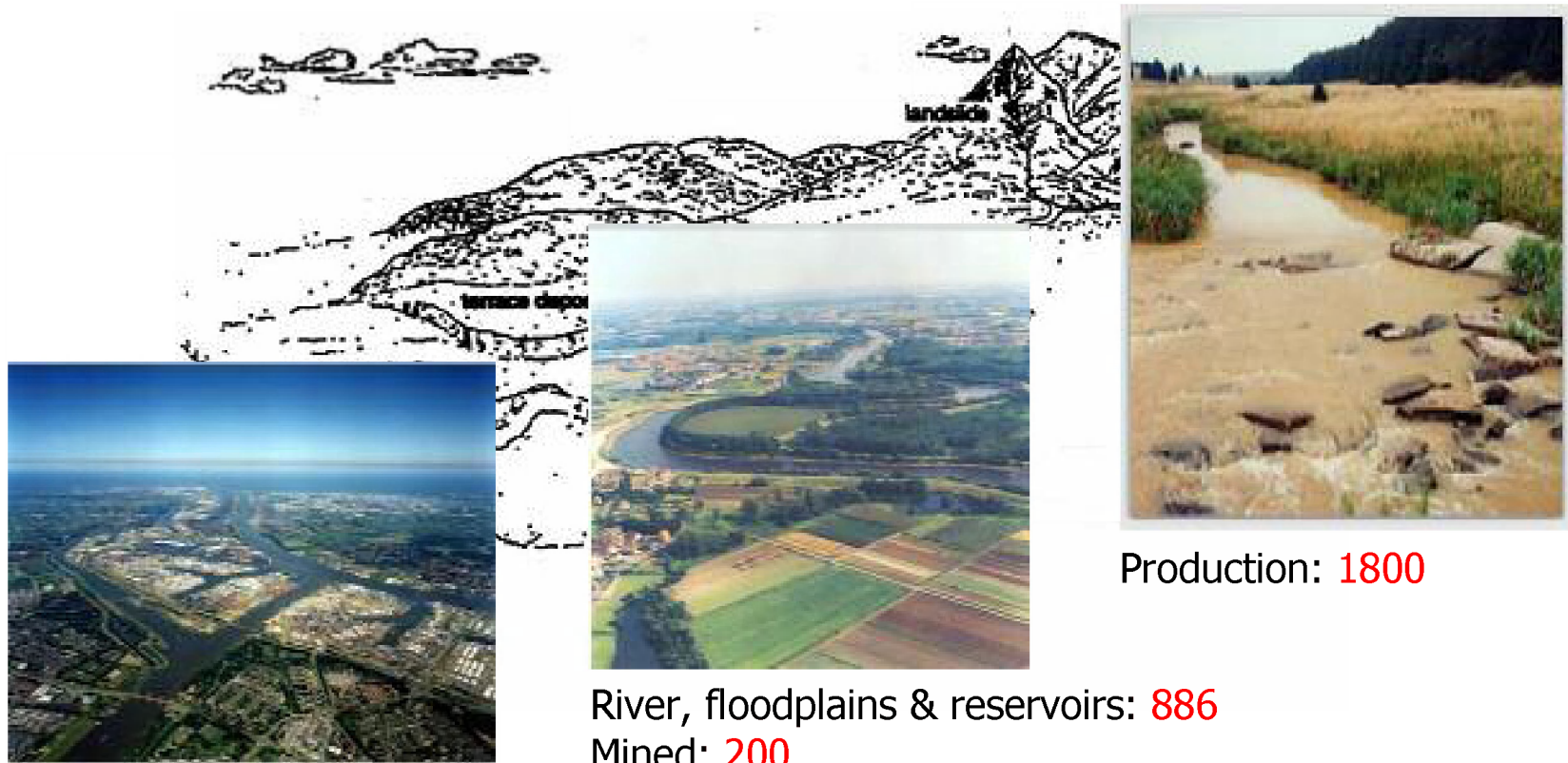


Sediment dynamics



Tentative sediment budget Europe

(x million ton per year)



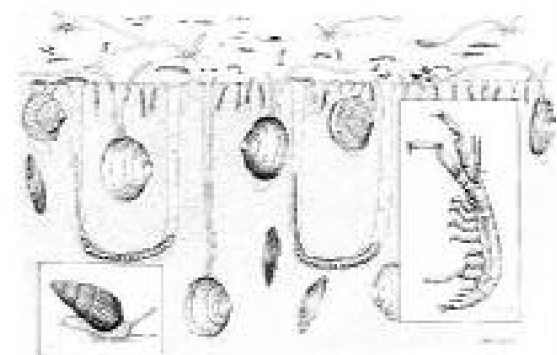
Estuaries, harbours, deltas
& discharged in sea: 714

(Owens & Batalla 2003)

The role of sediment

(Martin 2002)

Too much sediment	Too little sediment	Sediment as resource
Obstruction of channels Rivers fill and flood Reefs get smothered Turbidity	Beaches erode Riverbanks erode Wetlands are lost River profile degradation	Construction material Sand for beaches Wetland nourishment Soil enrichment Habitat and food for life



Sediment = essential and integral part of our river basins



Main threats

Quantity related:

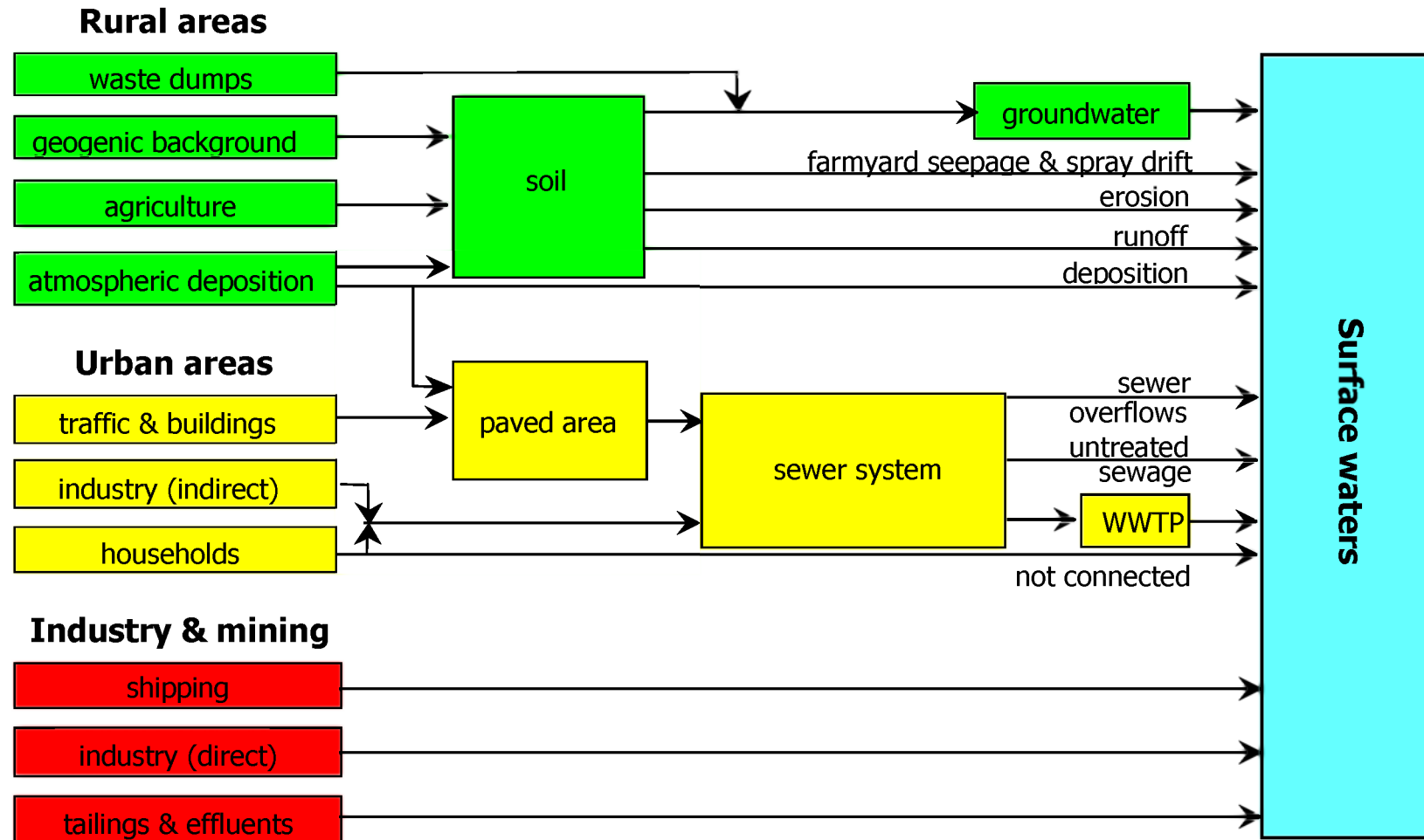
Too much or too little sediment (previous slide)

Quality related:

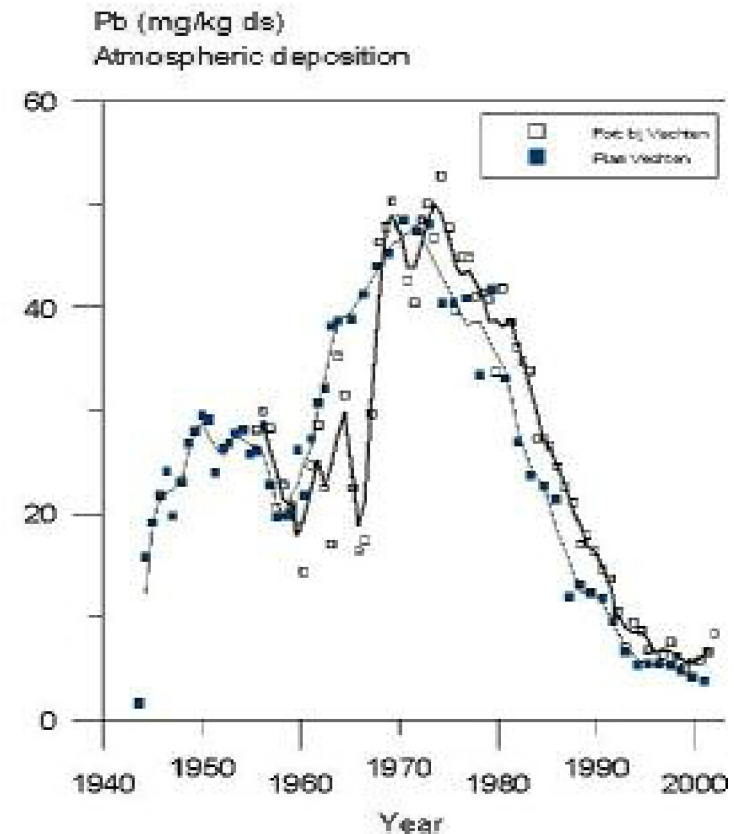
Contamination:
due to their nature many
hazardous chemicals
stick to sediment



Origin and pathways of contaminants



Legacy of the past



Sediment cores from Dutch lakes near Vechten (Walraven *et al.* 2004)

Environmental impacts of contamination

- Decreased abundance of species → decreased biodiversity
- Secondary poisoning through consumption of contaminated species
- Decreased water quality (sediment & water quality are linked)

But, at what sediment contamination level do these effects occur?



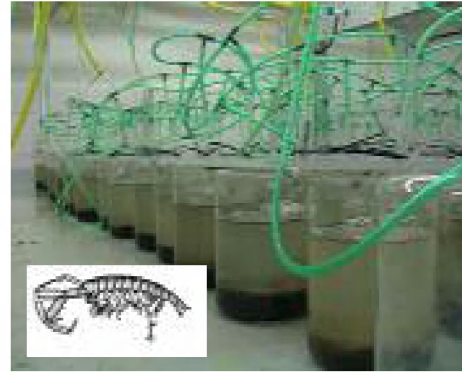
Assessment of contaminated sediment

Method:

chemical analysis



(bio)assays



field inventory



Detects:

contaminants

a.o. toxic effects

ecosystem impacts

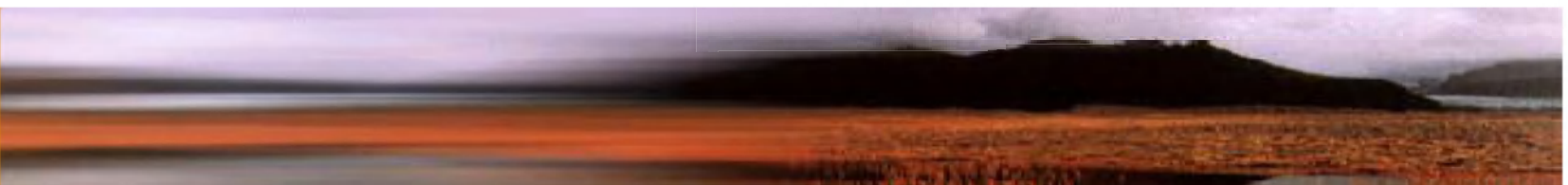
Assesses:

hazard

risk

impact

But, we know by now: hazard \neq risk \neq impact (we lack understanding)



Socio-economic impacts of contamination

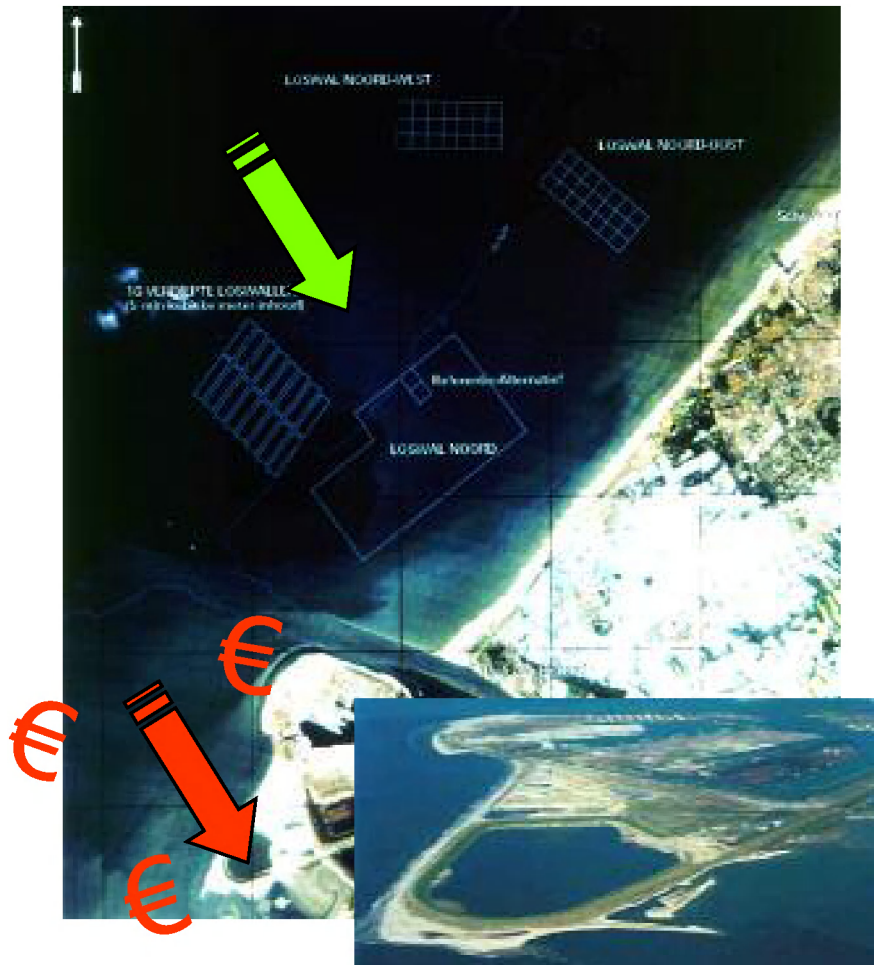
- Decreased valuation of sediment: 'its toxic waste' (**while it is a valuable resource**)
- Complicating management of dredged material (next slide)

But, no common perception of 'contamination':

- Typically countries along same river use different methods
- No uniformity in quality standards or guideline values
- Thus a lack of inter-comparability



Managing dredged material



Relocation of **clean** material



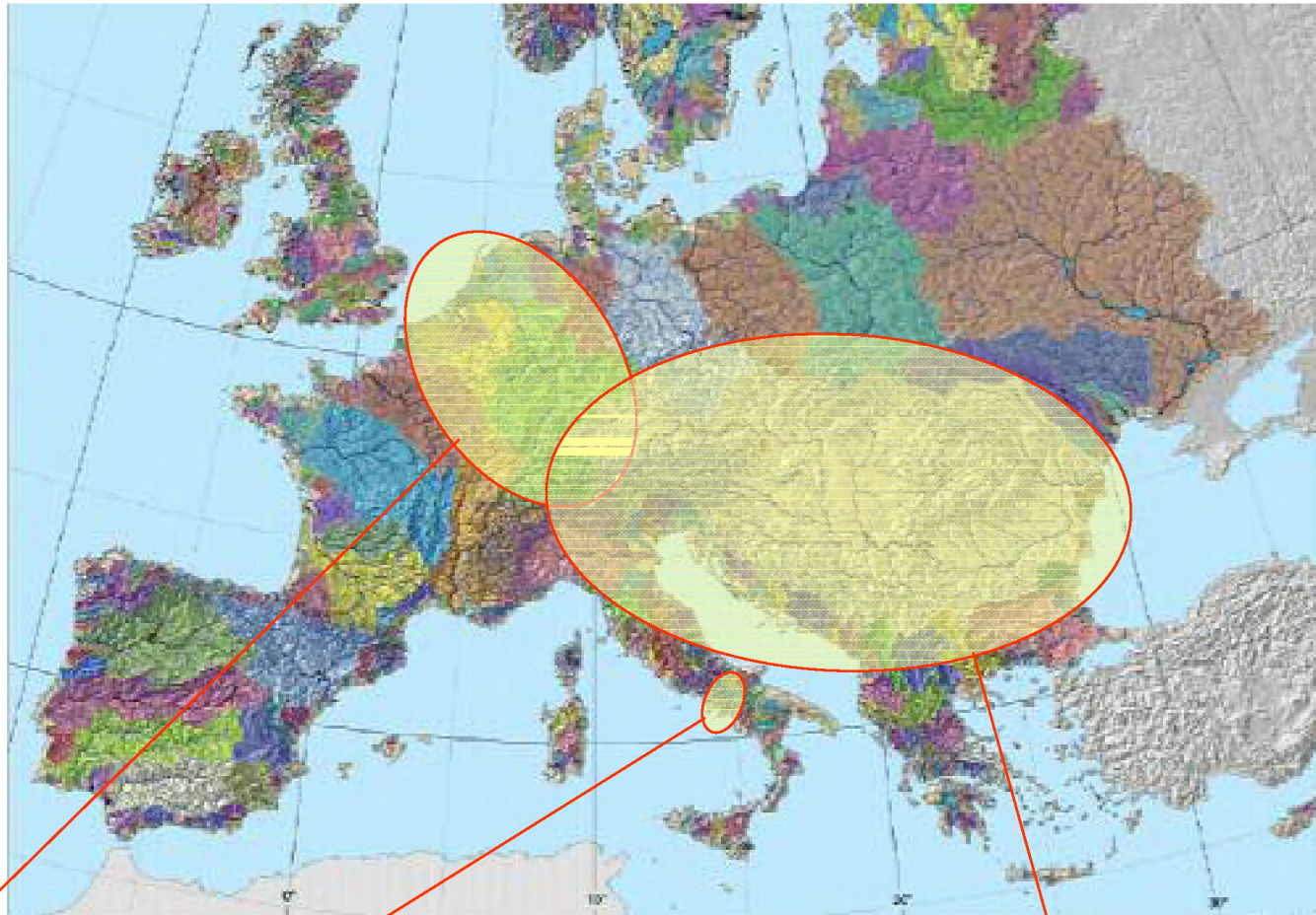
Confined disposal or treatment of **contaminated** material

But, why have downstream managers to pay for upstream problems?

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Management at basin scale



Rhine:

lot of experience

Sarno:

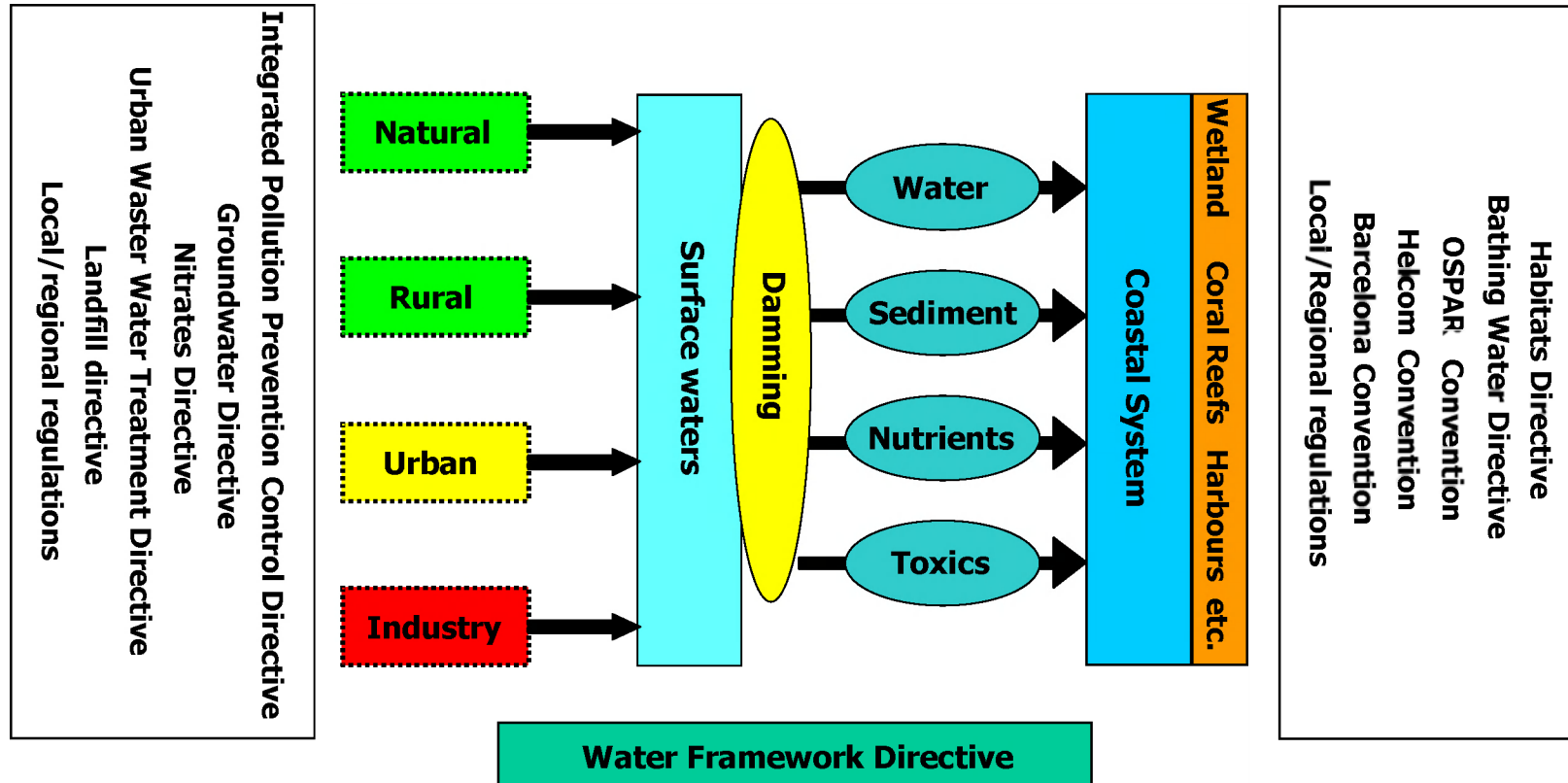
heavily contaminated, but
not much source control yet

Danube:

18 countries from the EU
'richest' to 'poorest'



Policies influencing management



But, they all only fragmentarily and indirectly address sediment



Changing perspective on sediment



Water Framework Directive implementation:

Sediment is integral and essential part of river systems, thus scope will shift from local to river basin scale sediment management

From hazard to risk based management:

Consensus is growing that it is better to look at actual risks or impacts, rather than on checking whether pre-defined sediment quality standards are exceeded

Stakeholders:

Their involvement in environmental policy development and implementation processes will become more and more important



Sustainable Sediment Management

(according to SedNet)

Find solutions:

- in the context of the whole river system
- carefully balancing environmental and socio-economical values
- in increased interaction with stakeholders
- not resulting in up-/downstream impacts, not now or in the future
- embracing the whole soil-water system (integrated solutions)
- respecting natural processes and functioning



Conclusions

- Sediment is a **valuable** environmental and socio-economic **resource**
- As sediment **belongs** in our rivers, relocation of dredged material is the preferred management option
But, although quality is improving, relocation is restricted in many cases. Thus we should continue **source reduction** efforts
- And we have to manage our **legacy** of the past
- European policies only provide a **fragmented basis**, to protect and manage sediment resources
- **Effective protection and proper management deserves a more focussed approach**



Recommendations



EU policy development:

Integrate sustainable sediment management into the European Water Framework Directive

Sediment management:

Find solutions that carefully balance the socio-economic and environmental values and that are set within the context of the whole river system

Research:

Improve our understanding of relation between contamination (hazard) and its actual impact to ecology and develop strategies to assess and manage the risks involved



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**Port of
Rotterdam**

Thank you for your attention

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