Figure 1: Relationship between ecosystems, functions and services
Roles and functions of aquatic ecosystems

- Production: organic matter; water ...
- Regulation: soil water retention; self purification; flows, climate..
- Organisation: landscape; biodiversity

Target 50 = Sustainability

Human activities and pollution sources
4 types of services

- Provisioning: food, water, materials, genetic and biochemical resources ..
- Regulatory
- Cultural: recreation, well being ...
- Supporting: soil formation, nutrient cycle ...
Including ecosystems in River/Lake Basin Management Plans

- Ecosystem considerations in basin planning processes (uses, users, quantity, quality .. Including ecosystems)
- From knowledge, understanding, to objectives, priorities, financial means ..
- Barriers to implementation (technical, financial, uncertain trends; governance...)
Management and restoration of aquatic ecosystems

60% of world rivers = fragmented by human

- Restoration practices: 20 pages with many examples around the world *(re-connecting brooks, floodplains, former meanders ..; ecological continuity; dam removing; environmental flow ...)*
- Green infrastructures and environmental impacts
Management and restoration of aquatic ecosystems

Natural Water Retention Measures (NWRM):

- cross-cutting objectives and results, in agriculture, urban, forest areas and aquatic environment
- Structural and non structural
- Passive and active techniques (often mimic of analogous natural structures / features)
A new paradigm for ecosystems
Sustainability A mixed portfolio

HARD
Traditional engineered “grey” infrastructure, budget, visibility

SOFT
Green infrastructure; NWRM
Bottom up; Participation; Ownership; Cumulative social and environmental implications
Governance and regulation

- The current water crisis affecting ecosystem services is mainly a crisis of governance
- European legislation and policies, including marine environmental policy
- Other examples
Governance and regulation

- Framework for the governance of aquatic ecosystems
Strategic instruments for effective aquatic ecosystem governance

Combining the conservation of aquatic ecosystem services with Integrated Water Resources Management (IWRM) Indicators; capacity building, networking ....

Main difficulties encountered in implementing restoration measures/projects
Monitoring aquatic ecosystems (22 pages)

Monitoring: what and how?

- Methods and protocols (State, Pressures …)
- Parameters
- Check the efficiency of action
- Recommend adjustments
- Inform the public
Aquatic ecosystems and the services they provide are inestimable.

But economic evaluation of ecosystems can make it easier to rank challenges and choices: why, what and how?

2010: Loss of ecosystem services in the world = 12 000 billion € = 6% of Global Gross Domestic Product.
Economic and financial aspects

- Payment for environmental services
  (Overview of PES implementation - Guidelines)
THE HANDBOOK FOR MANAGEMENT AND RESTORATION OF AQUATIC ECOSYSTEMS IN RIVER AND LAKE BASINS

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