# Implementing ecosystem services approach at the local level: expectations, barriers and insights

## ESAWADI PROJECT

***Webinar***
***28th March 2013***

ESAWADI

Regional and national research programmes network on
iwrm-net
Integrated Water Resource Management

# Presentation outline

1. Ecosystem services approach
2. ESAWADI project objectives and partners
3. Overview of our case study settings
4. Findings (concerns, expectations, insights)
5. Conclusion

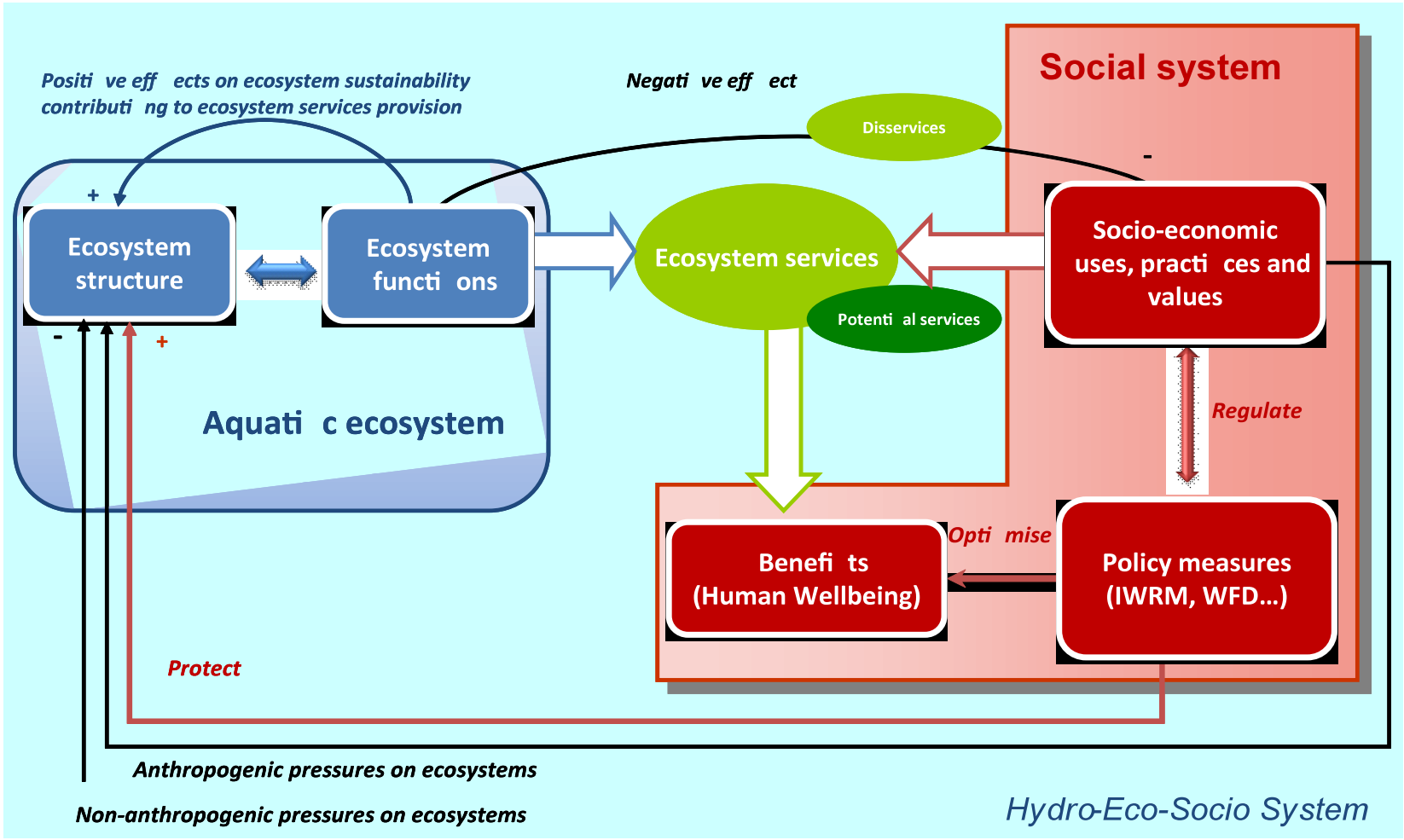
# ESAWADI project objectives and partners

To analyse and provide advice on the potential usefulness of the **Ecosystem Services Approach (ESA)** to support the implementation of the European WFD, in particular its economic requirements

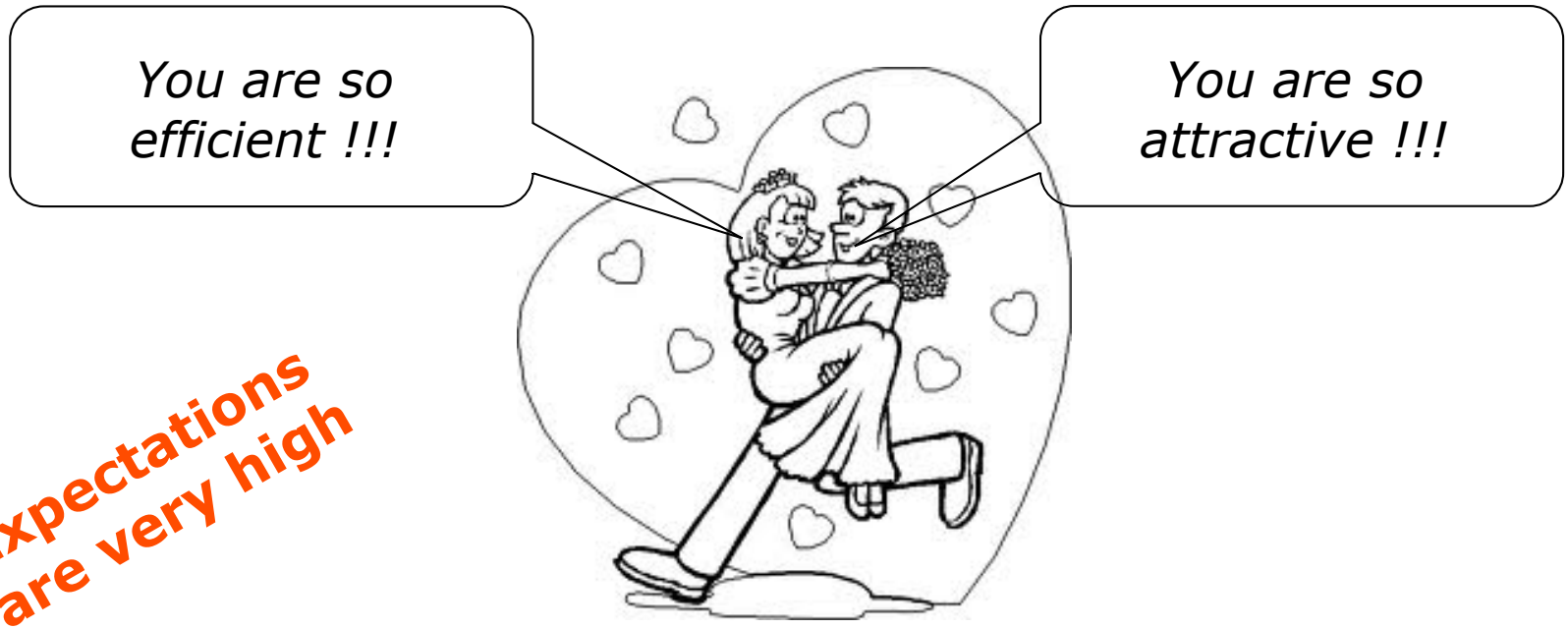
**Project team**

**Our funders**

# ESAWADI Ecosystem services approach



# WFD and Ecosystem services approach




**Expectations are very high**

***They married and had many healthy rivers, lakes and wetlands… Sorry, water bodies !!!***

# Ecosystem services

## From obvious illustrations

Fears also

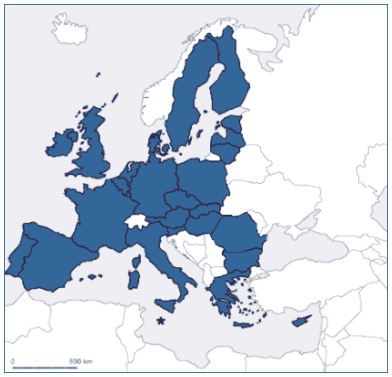

## To tricky evaluations

TABLE 1: Values of ecosystem services in tropical forests

| ECOSYSTEM SERVICE | VALUE OF ECOSYSTEM SERVICES (US$/ha/year – 2007 values) Average | Maximum |
|---|---|---|
| **Provisioning services** | | |
| Food | 75 | 552 |
| Water | 143 | 411 |
| Raw materials | 431 | 1 418 |
| Genetic resources | 483 | 1 756 |
| Medicinal resources | 181 | 562 |
| **Regulating services** | | |
| Influence on air quality | 230 | 449 |
| Climate regulation | 1 965 | 3 218 |
| Water flow regulation | 1 360 | 5 235 |
| Waste treatment/water purification | 177 | 506 |
| Erosion prevention | 694 | 1 084 |
| **Cultural services** | | |
| Recreation and tourism opportunities | 381 | 1 171 |
| **TOTAL** | **6 120** | **16 362** |

(Source: TEEB Climate Issues Update 2009)

# Operational context



Europe : WFD and other directives

Country : laws, administrative set-up


District : RBMP and other schemes

**WFD implementation has to integrate with / support national, regional, local initiatives and stakeholders**


River basin & local level: WFD measures, other schemes and initiatives

# Framework of analysis for the case studies

- Scope of work not just WFD but also IWRM
- Entry point: water management issues at local level for which ESA may bring a response
- Themes explored: linkages between
  - ESA and WFD requirements (incl. cost-recovery, cost-effectiveness, disproportionality of costs)
  - ESA and good ecological status (GES of WFD),
  - ESA and participation,
  - ESA and decision making.
- Three countries: France, Germany, Portugal

# French Case Study – Mid-Dordogne River


## Geographical data:

- An overall basin of 25 000 km²,
- Concern with the middle stream of Dordogne River, about 180 km out of 475 km
- Agriculture, tourism, fishing, urban development and activities

## Partners:

- Dordogne Basin Integrated Management Board (EPIDOR)
- Agence de l'Eau Adour-Garonne (Water Agency)

## Key issues:

- River dynamic and hydrogeomorpological issues
- River banks management and riverine ecosystems (oxbow lakes)
- Impact of hydro-electricity activity

## On-going processes:

- A river bank management plan under preparation
- Natura 2000 and Natural areas conservation initiatives from the Départements
- Riverbank protection operations from local public actors

# German Case Study - Ems River Basin


## Geographical data:

- ❑ Transboundary river basin: North Rhine-Westphalia, Lower Saxony , the Netherlands
- ❑ Focus: sub-basin of Hase river: upper basin provides (potentially) important nursing area for migrating fish
- ❑ Hase river length 168 km

## Key issues:

- ❑ Areas with one of the highest density of pigs & chicken in Europe
- ❑ Hydro-morphological pressures
- ❑ Lateral connectivity (eel migration) versus potential hydropower development

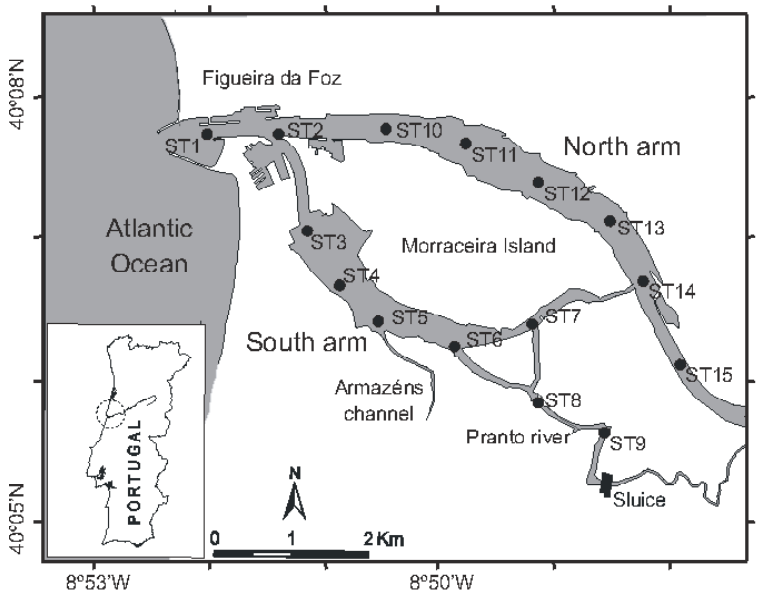
## Partners:

- ❑ Ministry of Environment and climate protection of Lower Saxony
- ❑ Regional Water Agency NLWKN in Meppen

## Strengths:

- ❑ International river basin (Netherlands/Germany)
- ❑ Similar issues to other CS: hydro-morphological pressures
- ❑ A hot topic of interest: linear and lateral connectivity

# Portuguese Case Study – Mondego Estuary




## Geographical data:

- Concern with the estuary 21 km out of 258 km
- 5.87 km² out of 6,702 km² catchment area
- Agriculture, urban activities, tourism, industrial activities, mercantile and fishing harbours

## Partners:

- Administração da Região Hidrográfica do Centro

## Key issues:

- Hydrogeomorphological changes
- Eutrophication symptoms and other pressures
- Ecosystem-oriented management
- WFD compliance and ecosystem services

## On-going processes:

- Definition of the RBMP (River Basin Management Plan)
- BQEs monitoring (Biological Quality Elements)
- EQRs and EQSs assessment (Ecological Quality Ratios and Status)

# Different skills, different context and dynamics

- Three very different case-studies
- Where all tried their best to implement ESA in relation to IWRM/ WFD
- We are not in a position to bring strong lessons for generalisation, since only 3 CS to draw from
- We can share specific and common experiences and outputs
- We can draw perspectives, make suggestions for the way ahead

# Research context and expectations

Greater integration into policy making (biodiversity):

TEEB report on Ecosystem Services for Water and Wetlands (2013)
*"The report shows how **capturing the values of ecosystem services** related to water and wetlands can lead to better informed, more efficient, and fairer decision making"*

EU biodiversity strategy "*by 2014 **ecosystem services** will be measured by each member state and valued by 2020"*

Requirement to include **analysis of ecosystem services** in relation to current trends/pressures in many French environmental strategies (e.g. regional ecological coherence strategies)

# ESAWADI approach

- Respond to the need of water managers/policy makers who implement WFD and integrated water basin management schemes
- To do so, we involved these end users through consultations and workshops regarding the ESA at their regional scale
- Interviews were conducted at the beginning and end of the project (particularly with economists in France and Germany)
- While looking at project results, it is important to see how they take into account expectations, fears and demands voiced by these end users.
- We structure our findings as following:
  - concerns/expectations/insights on the ESA concept and implementation,
  - ESA and education/participation, as well as decision making,
  - ESA and WFD economics.

# Ecosystem services assessment : 6 main tasks

1. Analyzing the context for setting objectives and methodology of ESA
2. Identifying, characterizing and selecting relevant ecosystems services
3. Analyzing the link between ecological functions, ecological status and ecosystem service provision
4. Valuating ecosystems services in qualitative, quantitative or monetary terms
5. Using ES assessment in decision-making
6. Organizing people/stakeholders participation,
   *implemented all along the process as a component of the other tasks*

# Findings 1:
# Perceived concerns with ESA concept/implementation

- Risk that Ecosystem Services maximisation goal replaces GES goal, "utilitarian approach" (commoditisation of nature)
- Risk of maximising some highly valued ES at the expense of others
- Evaluations take place at a scale which is not relevant and therefore loss of the river basin dimension
- Too abstract concepts and methods, quantification which are not robust enough and misleading

# Findings 1: Main expectations from ESA concept/implementation

- To be a comprehensive approach (identification, characterisation, evaluation)
- To be a valuable tool to identify relevant groups of stakeholders
- To help people understand and discuss ecological processes and highlight potential services that attaining GES will allow
- To give consistency to the whole WFD approach, particularly between technical (natural science / engineering) and socio-economic components (particularly the economic analysis)
- To be able to integrate with existing local water management practices
- To produce tools and methodologies which allow to engage fruitful negotiations (understandable and evidence based info)

# Findings 1: Main insights from ESA concept/implementation

- The ES concept is still in its infancy: lots of scientific debates ongoing (definitions, ecological processes, functions, ES categories, etc.)
- ESA is a structured and systemic approach for characterising benefits that ecosystems provide to society, it brings new perspectives into account by eliciting expert and local user's knowledge
- Socio-economic setting/ecosystem status helps understand why some services are not yet in use (potential vs effective), and how some improvement measures could make these services effective
- Monetary valuation is not always required (expensive, usual limitations with environmental economics still apply), qualitative descriptions/physical quantification very useful

# Findings 2: Perceived concerns/expectations with ESA as decision-making tool

- Expected to provide solutions for valuing benefits of ecosystems incl. monetary values, however ESA cannot offer robust quantitative assessments, so limited legitimacy of valuation results
- Does not solve assessment of environmental policy/programme benefits due to limited data and lack of standardised methodologies
- Uncertainty of results generated by quantification/valuation methods is a strong barrier for adoption (evidence that value of benefits related to the budget allocated to the evaluation i.e. extent of investigations)
- Lack of trust therefore that identification of ES alone can justify measures in favour of GES
- Ecosystems services benefits will never compete with benefits from productions like hydroelectricity or agriculture, and therefore they will justify decisions which do not go in favour of the environment
- Too much work for hardly any benefit

# Findings 2: Main insights on ESA as decision-making tool

- ESA's contribution is to provide broad /comprehensive view of impacts on ecosystem uses
- In most cases full quantification of benefits not required/possible
- Further research required to improve valuation methods (value transfers)
- Supports traditional environmental economic tools through production of qualitative, semi-quantitative and quantitative data (Mulino MCA, see following slide)
- Legitimacy of data can be enhanced through participatory decision making processes

# Findings 2: Main insights on ESA as decision-making tool

Mulino multi-criteria analysis

- The objective was to test how the MULINO software (MCA) worked on different ecosystem services improvements scenarios
- To assess effectiveness of the measures, the case study team looked at impacts on 4 different bundles of ecosystem services (water quality, selection of 5 ES, only indirect ES, and only direct ES).
- 2 calculation methods (SAW/TOPSIS) generate different results: alternative 112 or 187 with SAW or 247 with TOPSIS.

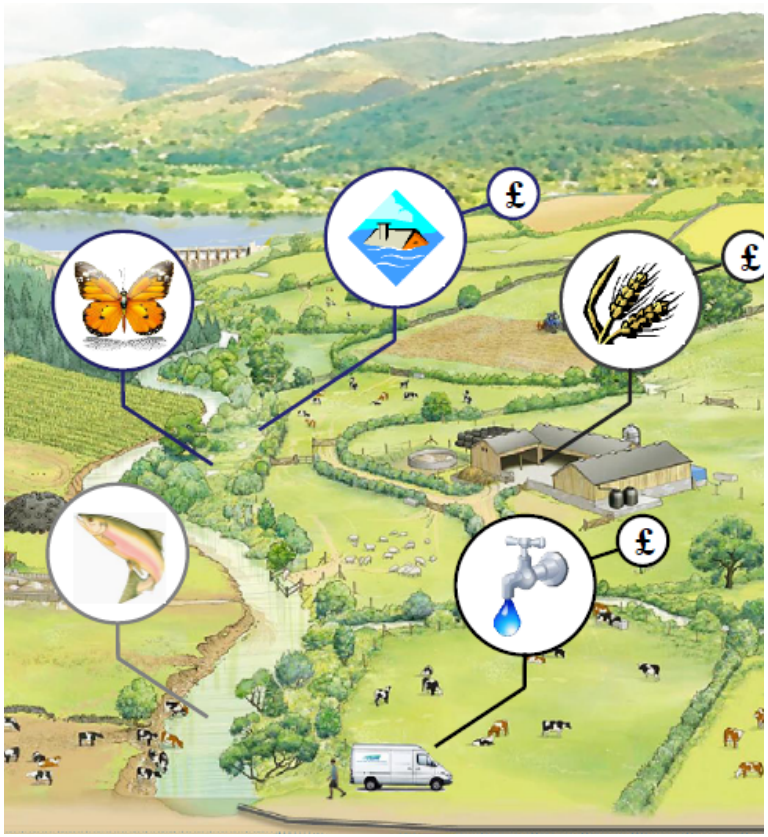
| Alternatives | | #1 | #2 | #3 | #4 | #5 | #6 | #7 | #8 | #9 | #10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAW | Water Quality | 112 | 77 | 152 | 40 | 187 | 111 | 76 | 19 | 46 | 115 |
| | 5 services | 187 | 152 | 115 | 112 | 231 | 80 | 210 | 188 | 77 | 151 |
| | Indirect services | 187 | 111 | 152 | 115 | 42 | 112 | 76 | 77 | 80 | 210 |
| | Direct services | 112 | 152 | 187 | 77 | 115 | 151 | 80 | 210 | 231 | 188 |
| TOPSIS | Water Quality | 247 | 242 | 246 | 235 | 240 | 215 | 233 | 194 | 241 | 216 |
| | 5 services | 247 | 242 | 246 | 235 | 240 | 215 | 233 | 194 | 241 | 216 |
| | Indirect services | 247 | 242 | 246 | 235 | 240 | 215 | 233 | 194 | 241 | 216 |
| | Direct services | 247 | 242 | 246 | 235 | 240 | 215 | 233 | 194 | 241 | 216 |

- Stakeholder ES ranking workshop: improvement of connectivity in the Hase river sub-basin

| Description of relevance (according to experts) | Stakeholders | Indicators / Quantification | Rating of actual relevance (1-4) | Rating of potential improvement (0-5) |
|---|---|---|---|---|
| **Provisioning Service: Fish (trout aquaculture)** | | | | |
| • Leisure activity<br>• Vocational activity<br>• Benefits: economy and health | • Trout breeder | • number of people doing trout aquaculture p.a.,<br>• Water for aquaculture ($m^3$ p.a.) | 1,3 | **5** |
| **Regulating Service: Water runoff** | | | | |
| • Retention areas / connected floodplains, reduced flood damage<br>• Water regulation<br>• Benefits: safety, economy | • Municipalities,<br>• people doing leisure activities,<br>• NLWKN, agriculture, property owner, Maintenance Associations | • flood area ($m^2$),<br>• costs of potential flood damage<br>• (agriculture, buildings),(de-)watering costs | **3,9** | **4** |
| **Cultural Service : Tourism** | | | | |
| • Hotel industry, catering<br>• Benefits health, economy | • Municipalities, tourism associations, angling association,<br>• hotels / gastronomy, renting agencies (canoe, bicycles, boats) | • no of guest-nights (2006: 125 000)',<br>• business turnover (2006: 9,4 million)'',<br>• no. of tourists (2006: 162 000) | **3,6** | 2 |

# Findings 3: Perceived concerns/expectations with ESA, educational tool and participation support

- Seen as a good educational tool for promoting local water policies (emphasis the benefits of unknown/ unrepresented ES e.g. cultural)
- Concern that concept is too abstract or complex
- ESA good tool to identify systematically stakeholders and possible conflicts
- Warning : choice of scale will change the stakeholders taken into account (upstream/downstream issues)



## Findings 3: Main insights
## ESA, educational tool and participation support

- ESA is a good communication and environmental education support tool: creates common ground on benefits of ecosystem protection and restoration, awareness raising on ecological processes and potential services
- To be an effective tool: key is to provide accurate picture of ecosystem services at stake, together with data (trends, indicators… ) and maps
- Relations between benefits and ecological processes should be highlighted and services resulting from improvement measures (see diagram next slides)
- Greater efforts required from scientific community to make concepts/messages understandable by large public
- ESA is a good participation tool to include all stakeholders in deliberative process

# FR: WS with riverside inhabitants

**Hymo processes**

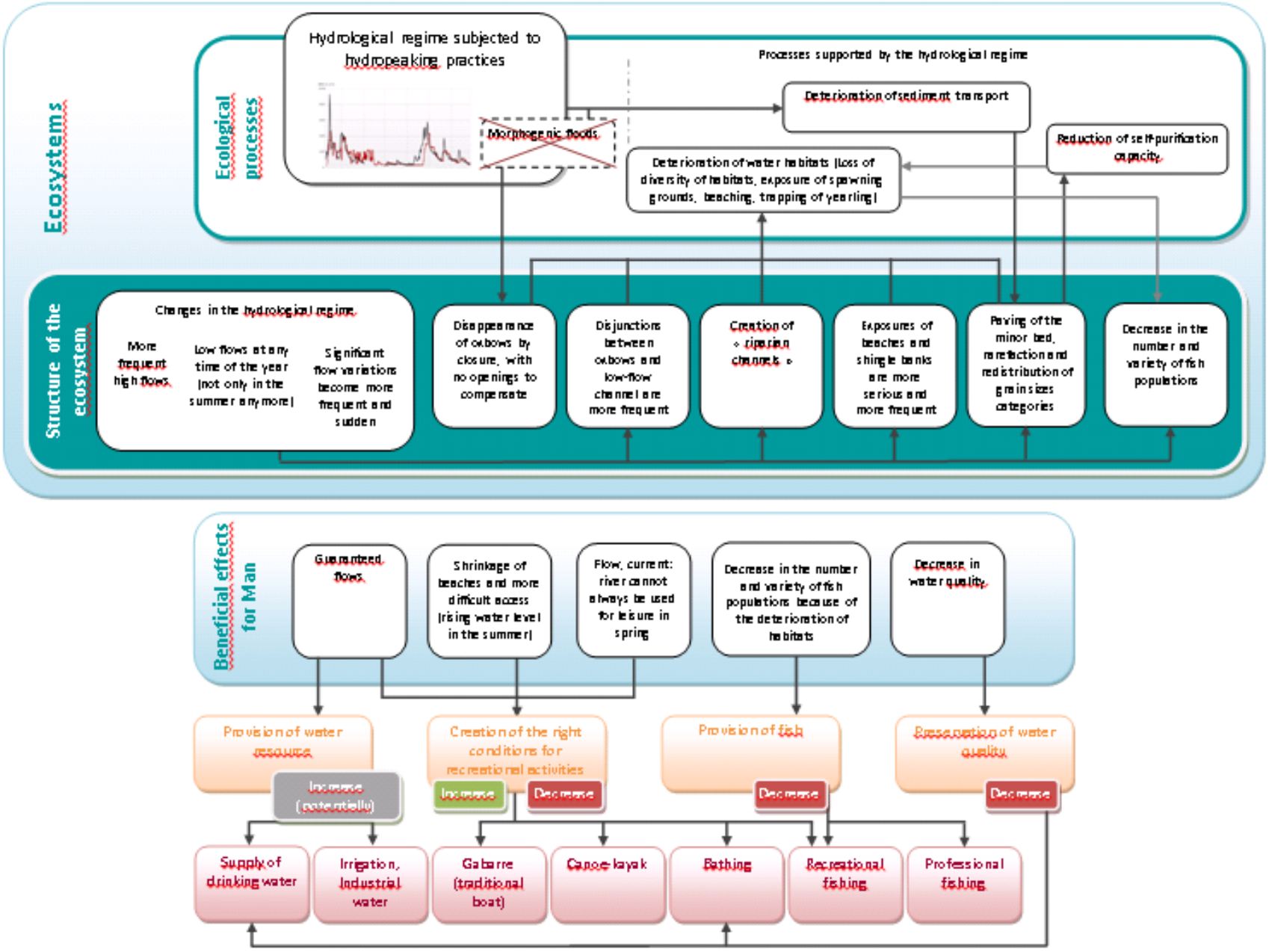
**Services identified by stakeholders**

**Results of the workshop**

**Dordogne ES/PP & Pedagogy**

| | Sediments dynamic conservation | | | Conservation of habitats and of their ecosystems | | | River and alluvial groundwater connexions conservation | | Water self purifying process |
|---|---|---|---|---|---|---|---|---|---|
| | River course | Alluvium and riffles presence | Riffle/pool bar alternation | Oxbows conservation | Aquatic habitats presence | Fauna and flora populations conservation | Low water level support | Water presence in riverside soil | |
| **Landscape** | *** | *** | ** | 0 | * | *** | 0 | 0 | *** |
| **Water for agricultural use** | ** | 0 | 0 | 0 | 0 | 0 | * | * | * |
| | * | * | * | - | - | - | - | - | - |
| **Territory attractiveness** | *** | | | ** | | | 0 | | ** or *** |
| **Water quality conservation** | *** | | | ** or *** | | | * | | *** |
| **Favourable conditions for water sports practice** | ** or *** | | | *** | | | 0 | | *** |
| **Migratory fishes** | *** | *** | *** | *** | *** | *** | * | * | *** |
| **Historical heritage, transport corridor, gastronomy** | *** | *** | *** | *** | *** | ** | 0 | 0 | ** |
| **Biodiversity presence** | ** | | | *** | | | ** | | ** |
| **Water availability for drinking water supply** | * | | | * | | | *** | | ** |

# Example of Ecological processes/structure and ES dynamics



# Findings 4: Perceived concerns/expectations ESA/WFD Economics

- WFD economic elements already a challenge for most water managers: basin wide application of economic methods
- Many expectations at European/nation policy making level on ESA as solution for applying WFD economics
- Many methodological uncertainties remain which questions the benefits of ESA in comparison with other economic methods

# Findings 4: Main insights from ESA/WFD Economics (1/2)

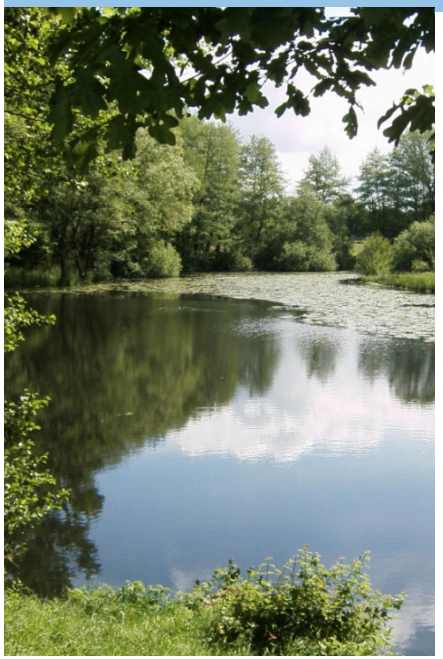
- Limited number of transparent/systematic methods which fulfil WFD economic requirements
- River Basin District economists reluctant to adopt another cumbersome approach on top of existing complex economic requirements
- However ESA can be used for WFD economics in other ways than « full quantification/monetisation »
- Art. 5 Water uses/services:
  ESA good for illustrating socio-economic uses of aquatic systems
- Art. 11 Cost-effectiveness of measures: YES for ESA if:
  - As qualitative assessment of ES and broader approach of benefits
  - To prioritise between measures
  - To prioritise between water bodies

# Findings 4: Main insights from ESA/WFD Economics (2/2)

- Art. 4 Disproportionality of costs: ESA can be used for systematic identification of benefits to include in a CBA, to provide qualitative info for non-market benefits for integration into multi-criteria analysis (cf. Leipzig Approach)
- Art. 9 Cost recovery: For some economists ESA not adequate/too disputable for assessing environmental and resource costs
- Payment for ecosystem services: ESA can help identify services/ practices for which a payment is relevant,
  but not for calculating financial compensation level.
- Need (new/improved) tools/good practice to incorporate ES in semi-quantitative way, combination of quantitative/qualitative data into decision matrix
- Key is have tools which can help to engage fruitful discussions with stakeholders, with easy to understand evidence.

# Conclusions

- Operational guidance required for ESA implementation and harmonisation of concepts/methods at European level
- ESA should be an integrated planning approach which builds on and creates bridges between existing policies, rules, regulations, initiatives
- It is not possible/desirable to quantify or monetize everything: level of ESA quantification to be adapted to main goal, context and available resources
- Main strength of ESA: it brings qualitative insights on ES and trade-offs between ES, good for description of water uses/ services (2nd round WFD/Article 5)
- More research required on links between geomorphological components, GES and ecosystem functioning



# THANK YOU!

For more info visit: www.esawadi.eu

Contacts:

philippe.blancher@asconit.com

catherine.wallis@asconit.com