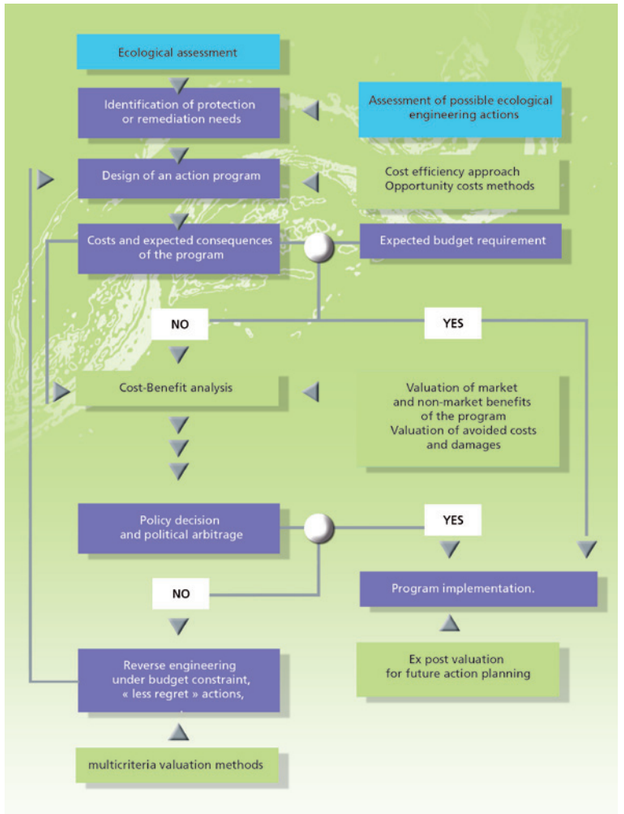
The embedding of ecological services valuation into environmental project management challenge

This challenge presents a methodological dimension. Most economic protocols (e.g. contingent valuation) are based upon the valuation of the demand for ecological services. But managing the supply side of the services requires methods like the opportunity costs approach or multicriteria assessment. Furthermore, valuation studies are typically required at different stages of an environmental project either to implement cost efficiency approaches or in cost benefit analysis of policy proposals.

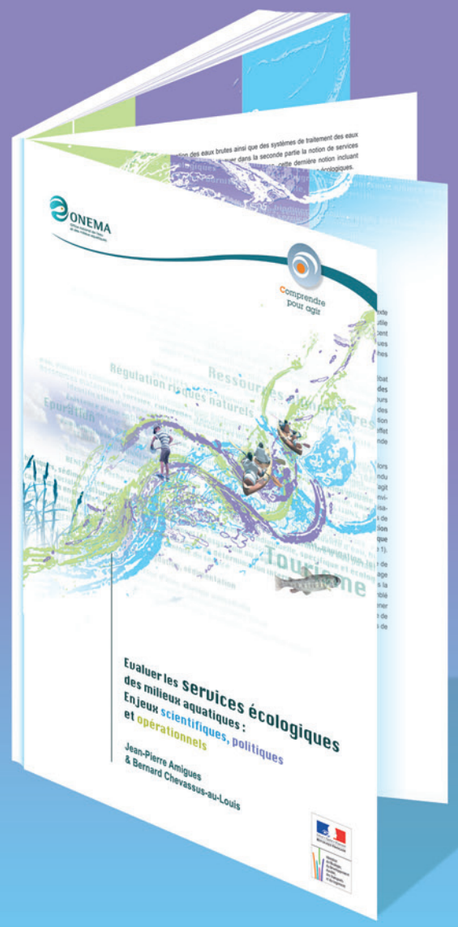
The potential use of economic valuation studies inside an environmental project.



The figure illustrates the typical design and decision making chain for an environmental project. Based upon scientific and engineering asessment (the project may use valuation approaches (at different stages before implementation. The design of the action program should comply with the cost eficiency guidelines of the WFD. If the available budget is unable to cover the program cost, cost-benefit analysis may be performed to justify an increase of the program funding by the stakeholders. If after the political arbitrage stage the funding is still insufficient, valuation may be used in a reverse engineering approach to determine the best plan under the budget constraint, making use of multicriteria methods or less regret methods. Last, after program implementation, ex post facto valuation may help improve the design of future projects.

This work was carried out within the Scientific Council moderated by Onema (the French National Agency for Water and Aquatic Environments) in particular its working group on "quantitative and qualitative assessment of ecosystem services of water and aquatic environments."

The collection " *Comprendre pour agir* " *(Understanding for action)* presents research and expertise outputs, available for teachers, trainers, students, scientists, engineers and water managers.



The complete book is available on the website of Onema (www.onema.fr/IMG/EV/cat7a.html) as well as on the national portal for technical papers on water (http://www.documentation.eaufrance.fr).
An english edition will be available during the course of the year 2012.

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Ecological services valuation for aquatic environments

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and Bernard Chevassus-au-Louis

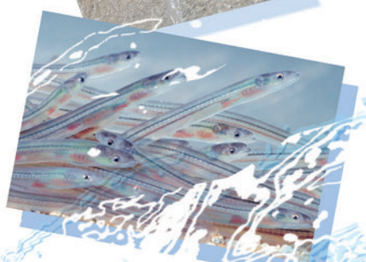
The notion of ecological services covers a set of tangible and intangible goods and services that derive from the natural world and benefit to human beings.

The ecological services provided by aquatic environments raise a growing interest among water managers and the wider community of stakeholders affected by the quality of these environments.

The book "*Ecological services valuation: scientific, institutional and operational challenges*" –to be edited in fall 2011– shows that an efficient use of ecological services valuation is at the crossroads of different issues and challenges both for the scientific communities involved and the water environments managers. It presents the main elements of what could be a use doctrine of ecological services valuation in management and policymaking context. This leaflet gives a snapshot of this work.

The theme of ecological (or "ecosystem") services has gained a prominent audience in recent years. Since 1997, several studies have contributed to better understanding and measurement of nature's contribution to human well-being, and make conclusions concerning their significant values in economic and social terms.

The economic and social valuation of ecological services represents a great challenge when it is applied to aquatic ecosystems. Considering the value of ecological services related to aquatic ecosystems has strong policy implications in the context of the implementation of the Water Framework Directive (WFD) in the European Union. It could also help the current practice of water managers by increasing awareness of the value of protecting or restoring aquatic environments in the public debate.



The ecological originalities of water environments and the complex interactions linking them to terrestrial environments call for a careful identification and understanding of the processes at the core of the ecological services provided by the aquatic life.
By valuing ecological services for water environments, one is confronted to two main issues:

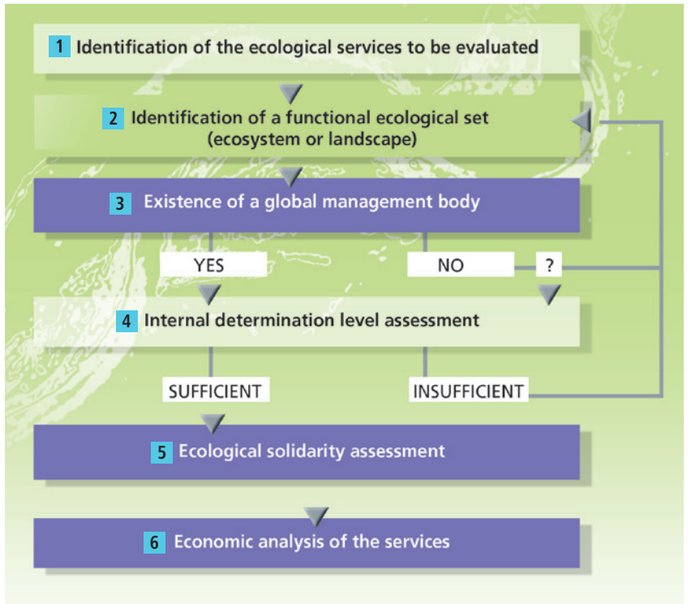
- **scientific issues** regarding a rigorous identification and definition of these services; the kind of spatial entities to be considered in a valuation exercise, together with numerous methodological difficulties when it comes to a monetary measure of the value of such services;
- **policy issues,** valuing ecological services may be helpful to inform, communicate and increase awareness of policy makers and the general public of the importance of protecting the environment for the benefit of society. In other cases, it could also help to design strategic management choices at the local level and to discuss them with the relevant stakeholders.

There is no simple correspondence between these two kinds of issues and the risk exists that a lack of dialog between science and policy may result in a misuse (or an insufficient use) of the valuation approach in decision making.

The "ecological" entity challenge

Many valuation studies take ecosystems as "given" by nature. This view may be seriously misleading when applied to aquatic ecosystems. We propose the use of the notion of "hydrosystem", seen as a spatial complex of physical, biological and socio-economic processes as the relevant basis for a valuation exercise. The report describes a stepwise operational method to identify such an ecological entity.

An operational framework for the identification of a pertinent ecological entity to be used for valuation protocol.



Steps 1 and 2 are relevant to ecological assessment that is they involve scientific expertise in biology and ecology. Step 3 tries to match the spatial entity previously defined with existing institutions able to take in charge its management. In the absence of such an institution, the process of step 1 and 2 must be reworked to redefine a manageable spatial entity. If a management body has been identified, then step 4 identifies ecological processes properly internal to the entity and ecological processes overlapping other processes outside the entity. If the spatial entity is governed more by internal rather than by external processes, then step 5 identifies the relevant stake holders and their connection (impacts, interests) with the ecological status of the entity. In the opposite case, the spatial entity has to be redefined at step 2. Based upon the identification of stakeholders, relevant impacts and interests, step 6 performs the proper economic valuation exercise of the ecological services supplied by the spatial entity.

The "long" water cycle challenge

For years, water managers have only focused their action in dealing with water availability problems and those related to water quality in terms of chemical or bacteriological, due to the uses from farming, industry, or households. We call that the "short" water cycle approach in which policy emphasis is being put upon the reduction of the adverse impacts of different water uses, either on water flow availability or quality in water bodies. The "good ecological status" required by the WFD asks for a change in water management towards a larger vision involving the quality of the natural aquatic environments by itself. This move from a "short" to a "long" water cycle vision implies some challenges for the water managers. In technical terms, it raises questions regarding the design of reference conditions for action and ecological engineering; in scientific terms, it raises challenges in the promotion of sciences (less in hydrology or chemistry, more in biology and ecology) and finally, in terms of governance practices which are aimed at involving political and financial stakeholders in issues of common interest to water policy.

The preservation of Nature as an asset issue

The concept of ecological services is primarily intended to draw a clear distinction between the environment as a natural asset, a source of wealth to be preserved for the sake of present and future generations, and the provider of a flow of services, the "ecological services", contributing to social welfare and to the conservation of natural assets. Such a distinction enables us to build a link between sustainability and the preservation of natural environments through a sound management of the ecological services they deliver. It is also helpful in the property rights debate where the issue is to distinguish between the rights relative to the property of nature as capital and the appropriation of the services provided by this capital.

The "supply" and "demand" issue

The purpose of economic valuation of ecological services is to link the natural environment with attributes relating to human well-being (exploitation of natural resources, health, quality of life, aesthetic enjoyment…). This link depends on historical, anthropological and social structures that mediate relationship between human beings and the natural world. In the context of an economic valuation of ecological services, this mediation can be analyzed as a supply-demand relationship.

On the supply side, it is difficult to isolate the value of ecological services provided by nature from the man-made equipment and investments that make them available. Benefiting from a natural reserve implies the existence of roads to get there and pathways to visit it. Fishing, bathing or rafting in rivers requires individual and collective equipment. The consequence is that any economic valuation of ecological services incorporates in varying proportion elements of value of the artificial devices used in the exploitation of these services. In addition, some ecological services, like the "supporting services", are mainly serving nature needs and cannot be reasonably given a monetary value. Monetary valuation in most cases tries to infer the value of such "primary" services from value estimates of "secondary" services, closer to current human use of ecological services.

On the demand side, the value given to the ecological services is highly dependent upon individual and social behaviour, which are typically very diverse and unstable and not immune to mis-perception and mis-use with respect to the true ecological importance of some services.