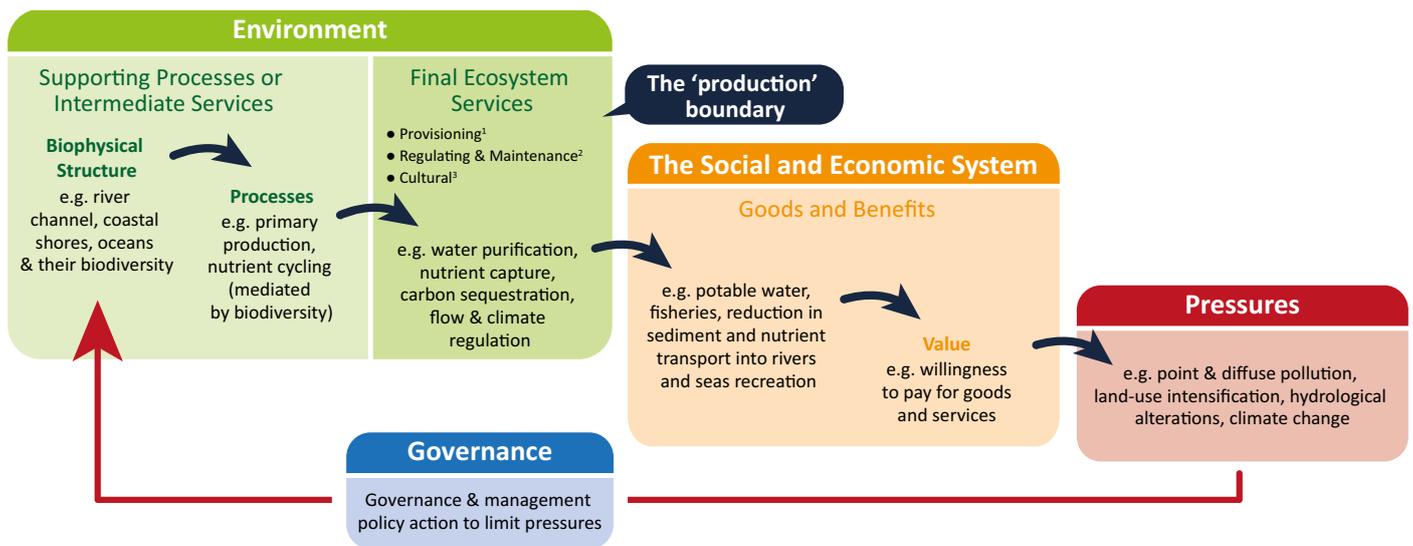


Integration of the Ecosystem Services Approach into Policy and Practice is Key for the Sustainable Management of Aquatic Resources

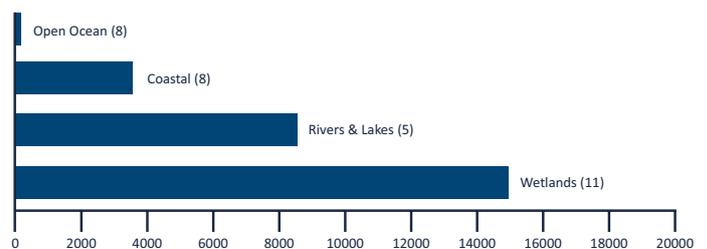
What is the Ecosystem Services Approach?

It is ‘a way of understanding the complex relationships between nature and humans to support decision-making, with the aim of reversing the declining status of ecosystems and ensuring the sustainable use/management/conservation of resources’.¹ The ecosystems cascade model (below) highlights linkages between supporting ecosystem processes and the delivery of final services that yield goods and benefits to humans*. Modified from² and³.



Aquatic ecosystems provide essential goods and services that support human life, economies and wellbeing. Examples include ‘goods’, such as water for domestic and industrial uses including food production, and ‘services’ that we benefit from, such as regulation of the risk of flooding, water purification, nutrient retention, carbon capture reducing the impacts of climate change, and places for recreation activities. Recent global estimates of the annual economic value per hectare of some key services ranges from US\$252/€215 (oceans) to almost US\$15,000 /€12,800 (wetlands).

The Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES)⁵ has expanded the assessment framework to address ‘Nature’s contributions to people’, which embodies the economic and socio-cultural values, thus capturing the widest range of benefits to people.



Average global economic value (US\$/ha/y) of aquatic ecosystem services. Numbers of services valued are given in brackets. (Data from⁴).

¹ Martin-Ortega, J., et al., 2015. What defines ecosystem services-based approaches? In Martin-Ortega, J., Ferrier, R.C., Gordon, I.J. and Khan, S. (eds), *Water Ecosystem Services: A Global Perspective*. Cambridge University Press, Cambridge, UK.

² Potschin, M. and Haines-Young, R., 2011. Introduction to the special issue. *Progress in Physical Geography* 35: 571–574.

³ COWI A/S, 2014. Support Policy Development for Integration of An Ecosystem Services Approach with WFD and FD Implementation. Towards Practical Guidelines to Support River Basin Planners. COWI A/S, Kongens Lyngby, Denmark.

⁴ Costanza, R., et al., 1997. The value of the world’s ecosystem services and natural capital. *Nature* 387: 253–260.

*Ecosystem Services Cascade diagram: (i) Material or energy outputs. (ii) Ways in which biodiversity mediates or moderates the environment. (iii) Non-material benefits, e.g. recreation.

Aquatic Ecosystem Assessment and Management in Europe

The ecological condition of many rivers, lakes and estuaries in Europe is alarming.¹ Pollution and habitat degradation from numerous land uses, including increasing demand for water, are serious threats to aquatic ecosystem health, which are leading to biodiversity losses.

Climate change is an additional pressure, and along with other pressures, is projected to further impact aquatic systems into the future. However, whereas the biophysical, i.e. the ecological status of aquatic ecosystems, is regularly monitored in Europe, the status of the aquatic ecosystem services and benefits to the people are not. This can render aquatic ecosystem management ineffective for several reasons:

1. Ecological status assessment does not sufficiently cover the functioning of the systems, i.e. the biophysical functions and processes required for nature’s contributions to people. Therefore, ecosystem managers may struggle to identify effective programmes of measures, to increase, for example, the retention of nutrients in a river reach or the amount of water retained on a floodplain. The ecosystem services approach can inform programmes of measures.
2. Ecological status assessment alone cannot sufficiently inform ecosystem management about priority management options under competing water uses, for example channel maintenance, drinking water supply, irrigation and recreation. Incorporating the ecosystem services approach can greatly assist decision-making, by taking into account the widest range of benefits and, where possible, assessing their value.
3. Sustainable ecosystem management in the long term relies on public acceptance, i.e. the people’s and, thus, the politicians’ support for sometimes long-term measures or schemes to protect aquatic resources that may be very expensive. The ecosystem services approach greatly assists communication of the scheme’s benefits to the people.

The following table highlights where the ecosystem services approach could be integrated.

Instrument	Target	Ecosystem Services addressed (Y/N)	Possible integration
Water Framework Directive	At least good ecological status or potential	No	Assessment (combined ecological and ecosystem services (ES) status assessment) and management, including identification of Programme of Measures (POMs)
Marine Strategy Framework Directive	Good environmental status	Refers to an ecosystem-based approach	Assessment (combined ecological and ecosystem services status assessment) and management, including identification of POMs
Floods Directive	Reduction of the adverse consequences for health, etc., associated with floods	No	Recognise the services provided by ecosystems to mitigate flood risk, e.g. nature-based solutions
CBD Biodiversity Target 2050***	Ensure the conservation, sustainable use and equitable sharing of the benefits of biological diversity	Refers to ecosystem services	Strengthen the outcome and support for conservation interventions by better linking and communicating biodiversity protection benefits to benefits for people
Birds and Habitats Directives**	Conservation of wild species and their habitat	No	Strengthen the outcome and support for conservation interventions by better linking and communicating biodiversity protection benefits to benefits for people
EU Biodiversity Strategy to 2030***	Restore degraded ecosystems and halt biodiversity losses	Refers to benefits from nature	Strengthen the outcomes of restoration projects by explicitly linking them to protection of ES/NCP

Also applies to Natura 2000 and supports the Sustainable Development Goals. *At the heart of the EU Green Deal.
The ecosystem services (ES); nature’s contribution to people (NCP); programmes of measures (POMs); Convention on Biological Diversity (CBD).

The EU Mapping and Assessment of Ecosystems and their Services (MAES) initiative is exploring ways to incorporate information on natural capital and ecosystem services into resource management and mainstream this across all Member States. A more detailed assessment is required in some countries.



¹ IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), 2018. Summary for policymakers of the regional assessment report on biodiversity and ecosystem services for Europe and Central Asia of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Fischer, M. et al. (eds). IPBES Secretariat, Bonn, Germany.



Six Steps to Integrate the Ecosystem Services Approach into the Assessment and Management of Aquatic Systems

Despite its heavily anthropocentric rationale and the often misdirected attempt to put price tags on each and every service, the ecosystem services approach is considered the best opportunity for convincing society of our dependence on nature. To effect the changes necessary to support water protection efforts and ensure sustainable delivery of essential ecosystem services, aquatic ecosystem management should integrate the following steps:

- 1** Make explicit the wide range of ecosystem services and benefits that are provided to people. Therefore, an inventory of provisioning, regulating/maintenance and cultural services should complement the biophysical monitoring of aquatic ecosystems. This will require identification of key attributes of the ecosystem services for data collection and new data collection initiatives in many countries.
- 2** Expand the assessment of 'ecological status' of surface waters to include an assessment of 'ecosystem services status'. The latter will be more easily acknowledged by the general public than the former.
- 3** Integrate both 'ecological status' and 'ecosystem services status', to inform the public of the importance of protecting ecosystems' health (including biodiversity, where appropriate) as a prerequisite for ecosystem services at desired service rates. This should include the often neglected, but important, benefits of regulating services (such as water purification, nutrient and water retention) and cultural services (such as recreation and inspiration).
- 4** Fully integrate nature's contributions to people into monetary assessments of ecosystem services. If a full integration is not feasible, for example because of a lack of sound methodology, any services not included should be clearly communicated and be considered in alternative assessments. This is of particular importance if the benefits of ecosystem protection and management are to be justified against the expenditure on the required management measures.
- 5** Identify synergies, disservices and trade-offs that can inform more beneficial, win-win solutions for aquatic ecosystems and water resources management. Synergies may be provided by nature-based solutions to water-related challenges, such as water retention measures in headwaters to reduce flood risk and wetlands for pollutant capture.
- 6** Better link the integrated ecological status–ecosystem services status assessment with (1) the Aichi and global biodiversity targets of the Convention on Biological Diversity, (2) the EU Biodiversity Strategy for 2030 and (3) the UN Sustainable Development Goals.



A constructed wetland for treating wastewater

What Next?

The potential of the ecosystem services approach is generally acknowledged but there are few guidelines on how to best integrate the approach into policy or practice. Equally, there are significant challenges, both institutional and practical. The Water JPI Thematic Annual Programming Action on Ecosystem Services (AQUATAP-ES) is identifying the needs of stakeholders, including key data and the tools required to apply the ecosystem services approach (such as numerical models and decision support tools and training). AQUATAP-ES will also produce guidance on developing decision-support tools and principles for decision-making.



Key Takeaways

1. Aquatic ecosystems provide so-called ecosystem services that yield goods and benefits that people and economies depend on.
2. Degradation of freshwater and marine ecosystems has led to alarming declines in biodiversity and ecosystem functioning with serious implications for their ability to sustainably deliver the goods and benefits that are essential to people.
3. Climate change is set to further impact aquatic ecosystems and the goods and benefits they provide.
4. The goods and benefits from aquatic ecosystems have high economic and socio-cultural value, which needs to be communicated to people.
5. The ecosystem services approach illustrates the link between healthy ecosystems and the goods and benefits that people and societies derive from them.
6. Current monitoring fails to adequately capture the impact of ecosystem degradation on ecosystem services and associated goods and benefits.
7. The ecosystem services approach can assist decision-making and aquatic resource management by taking into account the widest range of goods and benefits coming from aquatic resources.
8. Integrate or strengthen the role of the ecosystem services approach in policy objectives.
9. Integrate the assessment of the status of ecosystem services into ecological status assessment. Six key steps are given on p. 3.
10. Initiate standardised collection of relevant data collection on key ecosystem services. This will require identification of attributes that show a response to water and habitat quality degradation and which matter to people.
11. Support the integration of the ecosystem services approach with effective tools and guidance.

Circular Inset Images: Jan-Robert Baars

