Scotland's water-based ecosystem services

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The EU Water Framework Directive is one of the main influences on how we manage fresh and coastal waters. It aims to protect aquatic ecosystems whilst recognising the importance of human use, economic and social development. This fits well with the emphasis of the new UN Sustainable Development Goals on protecting and managing our natural capital underpinning the provision of drinking water and managing waste water.

Since the Directive was ratified in 2000, all EU member states have been busy making and implementing River Basin Management Plans. Scotland has been at the forefront of efforts to consider how to use ecosystem service concepts and the Ecosystem Approach in these plans. To inform the current cycle of River Basin Management Planning, the Scottish Environment Protection Agency have taken the radical step of characterising Scotland's waters using an ecosystem service classification. This represents a step-change versus previous approaches to describing and understanding our waters.

Ecosystem services from water range from the provision of food, water and energy, through regulating floods and droughts, to providing recreational opportunities and sustaining cultural and social identities. Supplying different services can interact and potentially conflict; for example, using water for hydropower can decrease its potential to support recreational benefits. However, Scotland's waters are often supporting industries, communities and nature conservation simultaneously.

We are used to managing for some of these services such as drinking water provision, but not others such as how water resources connect with our cultural and social identity, or how aquatic insects contribute to aquatic ecosystem services. Managing such services may be particularly challenging if they are not currently protected by laws, traded via economic markets, or widely recognised. For example, only in recent decades have we recognised the role of natural systems in regulating floods, so the services of naturally-functioning systems have often been degraded or replaced by artificial flood defences. Therefore, whilst measuring and mapping the services provided by our waters is innovative, attention is needed as to how the overall catchment is managed, how all relevant sectors of society are engaged, that local knowledge is included, and that the institutions responsible for catchments work in a more co-ordinated, if not collaborative, manner.

To achieve this, we can build on practical experience, academic studies and policy guidance. For example, Scotland already offers examples of integrated catchment management, complemented by general management concepts. A particularly important concept is the Ecosystem Approach, a holistic approach to management that was adopted by the UN in the same year that the Water Framework Directive was ratified. In Scotland, the Ecosystem Approach has been translated into three principles:

a) Consider natural systems;
b) Take account of the services that ecosystems provide;
c) Involve people.

Taking a systemic approach to managing our environment, however, is not simple or easy, and may entail several changes to the way we do things. Attempts to implement the Ecosystem Approach typically encounter several types of 'sticking point':

- Institutional – from previous ways of working, eg regulatory standards;
- Cognitive – from previous ways of thinking or framing issues;
- Political – from previous relations shaping who holds power.

Furthermore, it is difficult to integrate the Ecosystem Approach and ecosystem service concepts with policies that place less emphasis on the links between society and nature, such as the Natura2000 Directives for biodiversity, or which focus on one service, such as the recent EU Floods Directive.

Therefore it may take some time before the full promise of the Ecosystem Approach or ecosystem service-based frameworks are delivered. However, two recent pilot projects in Aberdeenshire and the Borders explored how an ecosystem service-based framework and the Ecosystem Approach could support an innovative approach to water and land use strategic planning. This work underlines the importance of water services, the pressure from intensive agriculture and forestry, and the threat of climate change.

Scotland is illustrating how ecosystem service concepts can be used in decision making and linked to policy implementation. As we strive to connect the key policies and involve all sectors of society in decision making, this should allow Scotland to plays its part in achieving the Sustainable Development Goals, illustrating how to manage and protect water for nature and society both here and abroad.

FURTHER READING

Scottish Government (2016), *Evaluation of the Regional Land Use Framework Pilots* [Aberdeenshire and Scottish Borders] (www.gov.scot/Publications/2016/01/9321)

Convention on Biological Diversity (2000), Ecosystem Approach (www.cbd.int/ecosystem/default.shtml)

Waylen KA & Blackstock KL (2015), *Sticking points – implications for environmental management* (www.knowledgescotland.org/briefings.php?id=393)

MacAdam CR & Stockan J (2016), *Identifying ecosystem services provided by freshwater insects* (www.knowledgescotland.org/briefings.php?id=394)

Orcadian lochan contributing provisioning, regulating and cultural ecosystem services.
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