

Technical summary

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Impact Assessment on Wetlands: Focus on Hydrological and Hydrogeological Issues R&D Technical Summary W6-091/TS

The Environment Agency is required under various UK and European legislation to assess the anthropogenic impacts, such as abstraction of water, operation of sluices or drainage, at individual wetland sites in England and Wales, in a consistent and defensible way. For many wetlands, there is a lack of understanding of how the water (rainfall, river flows, groundwater) interacts with the rocks, soils and organisms. In such cases, it is difficult to assess how any impacts will change the wetland's hydrology and ecology. In addition, there is no widely accepted method for carrying out an assessment. Consequently, there is a need to establish what is required to improve our conceptual understanding of these sites, as well as to provide guidelines to carry out assessments.

The technical report covers Phase 1 of a two part scoping study. The objectives of Phase 1 were to identify basic and applied research needs for wetlands in the UK and to identify the Agency's business needs with respect to the assessment of impacts at wetlands sites, in terms of what is required to meet the requirements of the various legislative drivers.

Project approach, issues raised and recommendations

Questionnaires were sent to staff to gather information on impact assessments including data collected, methods used for assessment and who was involved. The questionnaires were followed up with meetings to discuss the issues and experience in more detail and to help prioritise the work for Phase 2 of the project and beyond. The issues raised fell into 8 areas. The key issues and recommendations are as follows.

1. Conceptual Understanding

Key issue: Many impact assessments of wetlands are hampered by lack of conceptual understanding of how the wetland works hydrologically.

Key recommendations: Guidance and training should be produced for Agency staff on how to develop conceptual understanding of wetlands and their hydrological environment. In addition, a review of current approaches to wetland classification should be undertaken, particularly of past work by Lloyd and Tellam and current work by Wheeler and Shaw, and, if

appropriate, a system that captures our conceptual understanding should be recommended. If no such classification exists, a new one should be developed.

2. Objectives

Key issue: Within the wide range of drivers that require impact assessment of wetlands, objectives vary considerably.

Key recommendation: Guidance for operational staff related to setting and achieving objectives should be developed, including implications of the "do nothing" option; balancing conflicting interest (e.g. people v wildlife) and which designations take priority.

3. Data and monitoring

Key issue: Paucity of data on wetlands and lack of guidance on what data to collect is a major limitation for impact assessment.

Key recommendations: A consolidated guide to designing and operating wetland monitoring should be produced for Agency staff. This should include best operational practice within the Agency. It should include a route map for planning site investigation. Consideration should be given to defining default values for wetland evaporation and hydraulic conductivity. In addition, work on water regime requirements should be extended to other vegetation types.

4. Data interpretation and analysis

Key issue: Many tools, models and methods are available to interpret and analyse wetland data, but there is a lack of guidance on advantages and limitations of different approaches for various circumstances.

Key recommendation: A review should be undertaken of the methods and tools available to carry out impact assessment of wetlands, highlighting best practice in the Agency. It should include guidance on data needs of methods and the improvement in accuracy that can be obtained by collecting extra data, such as long time series and spatial heterogeneity and the costs involved.



ENVIRONMENT
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5. Assessment guidance

Key issue: There is currently no agreed procedure for impact assessment of wetlands and different approaches are developing in different Agency regions and areas depending on the type of wetlands, the nature of the impact and the skills and experience of the staff.

Key recommendation: An over-arching assessment framework is required that takes staff through the various steps involved, including conceptualisation of the hydrological systems, evaluating objectives, data collection, modelling and final assessment of impacts. The framework should be illustrated by case studies of best practice and should be a risk-based approach that allows for uncertainty and includes the likelihood of the impact.

6. Wetland restoration

Key issue: Under the Environment Act (1995), the Agency is required to protect or enhance the environment. However, some wetland restoration or creation projects represent an additional consumptive use of water in an already over-abstracted catchment or may increase flood risk.

Key recommendation: Guidance should be developed to determine under what circumstances wetland restoration is appropriate, with particular reference to conflicting priorities between enhancing and protecting the environment and safe-guarding the water needs of abstractors and flood protection.

7. Partnerships, project management and funding

Key issue: Wetland projects are multi-disciplinary and require collaboration from a range of organisations including water companies, English Nature, NGOs and local authorities.

Key recommendation: Guidance on project planning and management specific to wetlands should be developed.

8. Knowledge management

Key issue: It is often difficult for staff working on impact assessments of wetlands to find relevant information and best practice from other parts of the Agency.

Key recommendation: The potential for establishing wetland groups on a local level should be considered for sharing experience and best practice. A national point of contact for wetland issues and information should be established. The feasibility of a national database to hold information on wetlands should be examined.

Database

Part of the project was concerned with developing a database of reports and published scientific papers related to UK wetlands. These included internal Agency and CEH reports. The database is in Microsoft Access format and can be found on a CD ROM in the back of the technical report. Copies of papers and reports should be requested in the first instance through normal inter-library loan facilities; if this proves impossible CEH library should be approached.

Research needs

A workshop was also held for CEH staff to identify basic and applied research needs. The scope of the workshop was not exhaustive, but focused principally on the areas of scientific expertise and experience of CEH staff.

Key recommended areas for basic research included:

- Relationships between plant communities, soil moisture and micro-topography
- Evaporation processes in grasses, reeds and wetland trees

- Hydraulic connectivity between aquifers and wetlands

Recommended areas for applied research included:

- Methods and tools for restoring wetlands
- Conceptualising and modelling connectivity between aquifers and wetlands
- The role of wetland functions in achieving 'good ecological status' of the Water Framework Directive

Phase 2

The second phase of the project will develop four themes:

- Generic wetland settings for hydrological impact assessment.
- Guidance on undertaking a quantitative water balance at a particular wetland site.
- Review of evaporation rates from different wetland vegetation communities.
- Review of the methods and tools available for assessment of the anthropogenic impacts on wetlands.

This R&D Technical Summary relates to information from R&D Project W6-091 contained in the following output:-

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