



# Review of Impacts and Legislation of On-Site Wastewater Treatment Systems

**Title: Review of the legislative requirements and responsibilities relating to on-site wastewater treatment systems and their impact on water quality**

**Project Code: WFD96**

**Who this research is intended for: Environmental Regulators, Planners**

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## Objectives of the project

This project aimed to improve knowledge of the impacts of a dispersed population pattern on water quality and to inform future legislation, policies and procedures to address pollution related to wastewater treatment provision in rural areas. It was a desk-based research carried out for the Environmental Regulators within Northern Ireland, Republic of Ireland and Scotland.

The key outputs from the project are:

- Review of legislative requirements and responsibilities and identification of best practice;
- Literature review of the impacts of on-site wastewater treatment systems, including cumulative loadings and impacts on water quality;
- Identify methods used to estimate / quantify the nutrient loadings in discharges from small wastewater treatment works on water quality and provide recommendations on a suitable methodology for use by the Environment Agencies.

## Background

On-site wastewater treatment systems (OSWTSs) have been identified as a potential source of pollution to surface and groundwaters in areas where the dispersed nature of the population makes connection to a mains sewer impossible or overly expensive.

The impacts of OSWTSs arise from three main contaminants – nitrates, phosphates and microbiological pollutants. Nitrates and phosphates are a concern because of their effects on surface water ecology; in particular, the release of nutrients in sensitive waterbodies can lead to eutrophication and failure to comply with quality standards established for the Water Framework Directive (WFD). Microbiological contaminants can have serious consequences for human health if allowed to enter drinking water supplies.

However, there can be ineffective control of OSWTSs due to:

- Limited information on the number, location and level of maintenance of OSWTSs
- Limited information on the impacts of associated discharges on water quality and ecology.
- Inadequate communication and lack of a 'joined-up' approach between responsible authorities.

## Key Findings and Recommendations

### Review of legislative requirements and responsibilities and identification of best practice

Recommendations are made to address the management of OSWTSSs, both in the light of current problems and in order to respond to the developing needs of the WFD. The recommendations include:

- Establish location of existing systems and incorporate into a Geographic Information System
- Ensure OSWTSSs undergo annual maintenance  
*The two recommendations above could be achieved by making desludging an annual requirement and free for the first year, as done in Scotland; this would encourage owners to get desludging carried out more regularly, and would create a record of all OSWTSSs*
- Prioritise evaluation of existing systems based on location, waterbody characterisation, soil depth etc.
- Coordinate more effectively the responsibilities that are divided between planning and pollution control; in particular, the involvement of environmental regulators early in the planning process is seen as a priority
- Place responsibility for the preparation of applications on the applicant, as done in the Republic of Ireland
- House the results of site assessments and associated decisions, including details of sites deemed unsuitable, in a georeferenced database

### Review of the impacts of OSWTSSs

A significant number of households rely upon OSWTSSs (>400,000 properties in the Republic of Ireland, ~120,000 in Northern Ireland, >100,000 in Scotland). In theory, loadings of contaminants from OSWTSSs should not be of concern to water quality; however, if sited incorrectly or poorly maintained, effluent quality will be reduced.

The project reviewed previous studies to estimate the contribution from OSWTSSs to diffuse pollution loadings:

- In Scotland and Northern Ireland, microbiological contamination of groundwater supplies is of concern due to the relatively high contribution from OSWTSSs compared to other sources\*.
- Phosphorus (discharged in the form Soluble Reactive Phosphorus) from OSWTSSs is estimated to contribute over 28% of the total diffuse phosphorus load to surface waters in the Republic of Ireland, 10% in Northern Ireland, and 4% in Scotland.
- The contribution of OSWTSSs to diffuse nitrate pollution, when compared to other sources, is relatively small.

\*Comparable data was not available for the Republic of Ireland

Impacts of OSWTSSs may be more significant at a local scale. The status of receiving watercourses is also important, as systems discharging into already sensitive waters could give rise to status deterioration with only small increases in contaminant concentration.

### Recommendations on a suitable methodology to estimate nutrient loadings in discharges

To estimate nutrient loadings from small wastewater treatment works, this project recommends a methodology based on a “pressure-pathway-receptor” model. The methodology could be used proactively during the consenting stage to prohibit the use of OSWTSSs in areas most at risk. Alternatively, the tool could be used to assess the risk of systems already in operation, and the impact of poorly-maintained OSWTSSs on water quality.

If the methodology is to be taken forward, it will require significant further development to ensure the assumptions used are appropriate for a particular region, and to make it into a user-friendly tool.

## Further Information

Copies of the research outputs are available for free download from [www.sniffer.org.uk](http://www.sniffer.org.uk) (Project Search: WFD96). For further information, please contact SNIFFER.

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## Partners

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Northern Ireland Water  
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