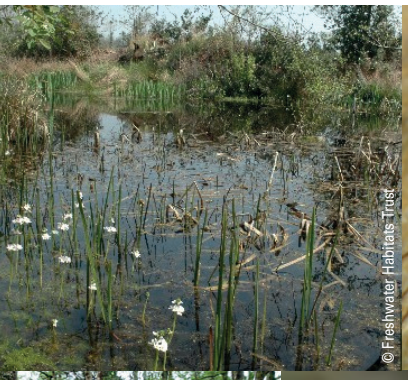
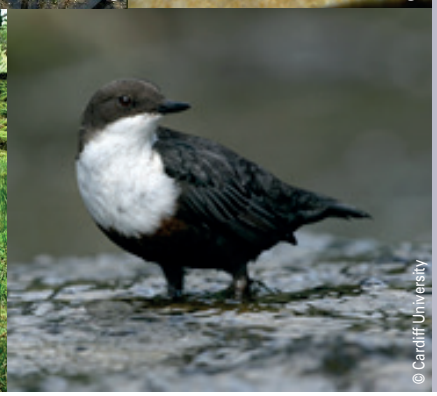
How can the impact of human-generated degradation of small water bodies be reversed and the vital ecosystem services they provide be restored?

Options for policy development and restorative action





What's the issue? Small Water Bodies (SWBs):

- Comprise ~75% of the total running water network;
- Encompass naturally-created and man-made standing and running freshwater habitats including: small streams, ditches and ponds;
- Not protected sufficiently by EU WFD or Habitats Directive;
- Provide vital ecosystem services and underpin the quality of larger watercourses protected by EU legislation;
- Highly vulnerable to unintended human-generated (anthropogenic) pressures due to their close connectivity with the terrestrial environment;
- Largely managed by riverbank (riparian) and other land owners. This is contrary to the ideals of Integrated Catchment Management; better SWB management would result in significantly improved ecological status downstream.

Policy Relevance:

UK policy commitments to rural economic growth, food and water security and renewable energy have inadvertently increased pressures on SWBs. Avoiding conflicts with the needs to: reduce flood risk, reduce water stress, and improve water quality, requires careful management to ensure wider environmental benefits and wildlife protection. **Therefore, SWBs should be an urgent priority for policy recognition and development.**

wfd Water Framework Directive UK TAG

Catchment Based Approach Partnerships for Action

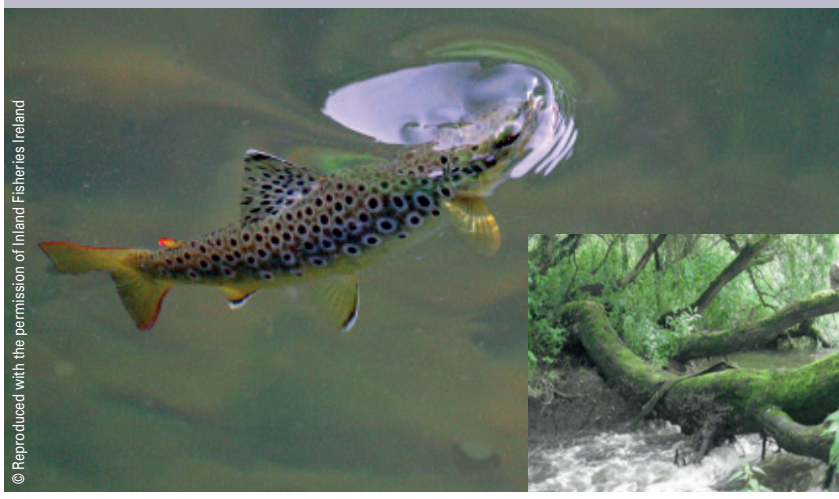
25 YEAR PLAN Department for Environment Food & Rural Affairs

Llywodraeth Cymru Welsh Government

The vital ecosystem services SWBs provide include:

- Natural flood/drought control;
- Thermal regulation;
- Trapping sediment and contaminants;
- Nutrient retention and cycling;
- Maintaining biological diversity.

All of which extend into downstream river reaches, lakes and estuaries.



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Anthropogenic impacts on SWBS arise from:

- Channelization for drainage;
- Intensive adjacent land-uses for agriculture, forestry and urban/industrial development;
- Sediment, nutrient and contaminant run-off;
- Climate change;
- Invasive non-native species.

These effects on hydrological, chemical and biological processes threaten native species and disrupt natural ecosystem function.

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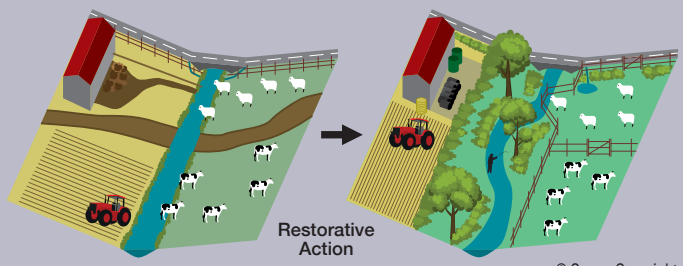
Withers, P.J.A. *et al.* (2009). Characterization of phosphorus sources in rural watersheds. *Journal of Environmental Quality* 38, 1998–2011.

Recommendations

Effective restorative action requires:

1) A three-tiered approach:

- Managing harmful activities in the wider catchment;
- Restoring and managing the natural riparian zone;
- Restoring SWB natural processes (e.g. hydromorphology of stream channels and clean water in ponds).



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2) Incentives, instruments and governance:
Practical options would ideally be voluntary, with or without financial incentives, but markets for resource services and legislative regulation are also options. Integrated programmes should provide multiple environmental benefits while delivering public and private good alongside cost-savings to landowners. Brexit provides an opportunity to develop new policy instruments as current agri-environment schemes are revised or replaced.

3) Prioritisation and stakeholder uptake:
Successful restoration requires greater prioritisation of SWBs in catchment planning, management and delivery – by regulators, farm clusters, industry partnerships or third-sector collaboration. Improved communication of expert advice, a greater awareness of the important ecosystem services provided by SWBs, and the downstream benefits of restoration, are crucial. The size and scale of SWBs encourages ownership and buy-in from landowners, stakeholders and local communities, facilitating more effective uptake of policy actions.

For more information reference: Riley, W.D. *et al.*, (2018). Small Water Bodies in Great Britain and Ireland: Ecosystem function, human-generated degradation, and options for restorative action. *Science of the Total Environment* 645, 1598–1616. https://doi.org/10.1016/j.scitotenv.2018.07.243