

The impact of cattle on freshwater ecosystems

Unrestricted cattle access to watercourses has been linked to deterioration in water quality arising from contamination with faecal matter, increases in suspended sediment, and nutrient enrichment. Preventing such access by fencing off streams and rivers is one of the measures included in the Irish government's new Green Low Carbon Agri-environmental Scheme, GLAS.

Studies on similar measures in other jurisdictions, for example the USA, New Zealand and Australia, have reported improvement in water quality in some cases, but, to date, there has been no intensive study of their effectiveness under Irish conditions, and indeed few studies in Europe generally.

COSAINT - Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications is an EPA funded project (2014-W-LS-6) led by Dr Daire Ó hUallacháin of Teagasc which will run for four years from 2015. Partners include Dundalk Institute of Technology (Drs Eleanor Jennings and Suzanne Linnane, and PhD student Patricia Antunes), University College Dublin (Dr Mary Kelly-Quinn and PhD student Matt O'Sullivan), Dublin City University (Prof. Fiona Regan) as well as Teagasc partners. The project will assess the impacts of cattle access on nutrient and sediment loading, on faecal contamination and on biological quality of streams, and will undertake a socio-economic assessment of cattle exclusion measures in Ireland. Study sites have been selected in three moderate status catchments (Co. Louth, Co. Monaghan, and Co. Wexford), and two high status catchments (Co. Cork and Co. Kerry). In one study catchment, the Milltown Lake catchment in Co. Monaghan, one of the three tributaries of the Drumleek River was fenced in its entirety to exclude livestock in 2008 with the cooperation of the local farming community, during the National Source Protection Pilot Study. This new project now offers a unique opportunity to quantify the impacts of this mitigation measure eight years on.

The project is using a combination of high frequency sampling and motion detection cameras to capture information on the extent and duration of cattle access to these watering



CATTLE CROSSING A STREAM

points and on concurrent changes in water quality. The effects of cattle access points and cattle in-stream activity on aquatic biota are also being assessed using macroinvertebrates, as well as the extent of ecosystem impact and recovery downstream from sites. The study sites include those with existing cattle access points that are targeted for inclusion in the proposed GLAS scheme. On a national scale, Teagasc partners in COSAINT will undertake a survey to identify the number of farms with on-farm water courses, and an assessment of the cost-effectiveness of existing and potential livestock exclusion measures for the farming sector. One of the key challenges to increasing the participation rate of farms in voluntary cattle exclusion measures such as those proposed in GLAS is the provision of alternative sources of water. There is a large body of

literature in relation to the provision of water in agriculture (e.g., nose-pumps, solar pumps, pumping from streams, pumping from ground water). However, the feasibility of implementing some of these measures under Irish conditions, and the likelihood of adoption by farmers (particularly more extensive farmers) remains unclear. The socio-economic study will also include an assessment of the 'willingness to adopt' cattle exclusion measures and determine what if any incentives are required to ensure adequate participation that is voluntary. The project will be of relevance to a wide range of stakeholders, including researchers, land-owners, and policymakers, and will inform future agri-environmental measures.

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CATTLE IN A STREAM, WITH SOME EROSION OF THE BANK