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Monitoring techniques to assess soil erosion and nutrient loss from arable land to water within the Mitigation of Phosphorus and Sediment (MOPS) project

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Assessment and mitigation of agricultural impacts on water quality generally takes place at the sub-hillslope scale, using bounded plots which can be easily replicated. Traditional experimental designs have a number of problems associated with them. These include (i) the imposition of artificial boundaries on the landscape which prevent the processes occurring in the plots being representative of the processes occurring in the surrounding hillslope, due to the hydrological isolation of experimental areas, and generation of runoff along plot boundaries, (ii) the disturbance of natural hydrological pathways and connectivity within the catchment, and (iii) the limitation of the area which can be observed due to the infrastructure needed. The field design of the UK-based Mitigation of Phosphorus and Sediment (MOPS) project aims to overcome some of the limitations of traditional monitoring techniques. In this paper we will examine a number of the approaches which have been taken within MOPS, including using hillslope-length scales for observation rather than traditional hillslope plot scales, using unbounded areas rather than bounded plots, and using flow splitters to partition only a proportion of runoff for sampling. The disadvantages of using these approaches, including the difficulties of using unbounded plots to determine the effectiveness of different mitigation practices on runoff and pollutant losses from arable land, will also be discussed.