

The Ditch of the Future: Managing Flow and Pollution Rates in Agricultural Systems

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Ditches within the agricultural landscape provide a key agronomic benefit by helping to improve land drainage in order to provide favourable soil conditions. However, the export of pollutants and possible contribution to local flooding associated with ditches is being largely ignored. Sedimentation occurs naturally in ditches but is perceived as a problem due to a reduction in flow capacity of the channel. Thus, ditch management is often very active and can result in highly connected and polluting flow pathways. There are many modified drainage features and low order channels on farms that could be modified and managed in a new way. Ditch modification does not need to affect agronomic function, but could trap sediment and other pollutants, and lower flood risk, if designed appropriately. Ditches are already highly modified features and therefore further modification should not be an issue. Helping farmers to create, manage and maintain the 'ditch of the future' is vital for adding hydrological attenuation capacity to agricultural landscapes. Here we will show several examples from UK farms that demonstrate how the typical ditch form can be modified, e.g., widened and flattened, to create 'zones' conducive to sediment (and associated pollutants) deposition, and the construction of within-ditch leaky barriers to temporarily store runoff. A 50m stretch of ditch draining 0.7 km² of arable land was shown to remove ca. 50% of the sediment and 30% of the total phosphorus concentration or a cost of 5000 euro. It is proposed that a network of barriers positioned along a ditch could yield a much greater impact than interventions in isolation. If space allows, then a ditch can be modified to retain significant volumes of flood flow. A scheme of this nature will be presented for an Irish Agricultural Catchments Programme research site.