Water Sensitive Farming work at Ampton

1. Introduction

Norfolk Rivers Trust (NRT) conducted walkovers of the River Lark and its tributaries (Figure 1a) in winter 2019, as part of a project funded by the Environment Agency to identify catchment issues including diffuse and point sources of pollution.

Following on from this, NRT farm advisers developed plans for on-farm opportunities, one being at the Ampton Estate which drains a catchment area of approximately 250 hectares, and is hydrologically connected to the River Lark (via 'Blackmoor Bottom', which runs through the farm holding, and Culford Stream, which directly feeds into the Lark (Figure 1b and 1c)).

A detailed farm visit was undertaken with the landowner at Ampton Estate to further explore issues associated with surface run-off, land drain outputs and the 'flashy' flow of Blackmoor Bottom – which was leading to the flooding of fields and a highway during extreme rainfall events, as well as the erosion of a downstream gateway.

Informed by on-ground knowledge and risk mapping (Figure 2), measures to improve water quality, and to provide other benefits, were proposed.

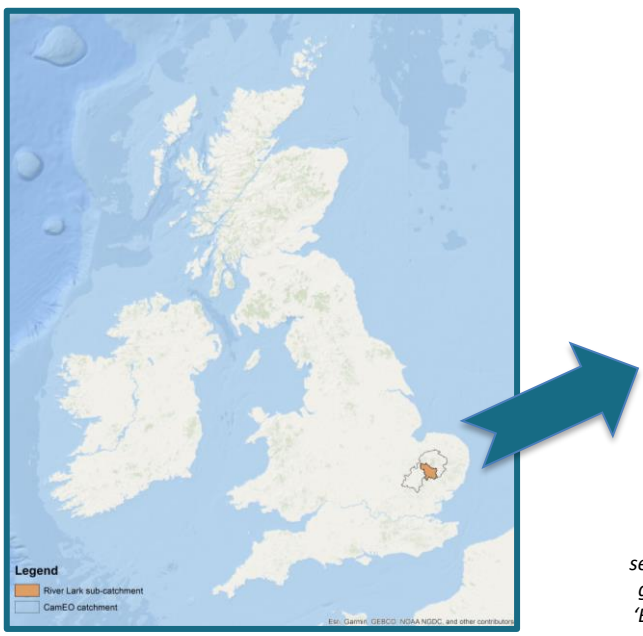

Figure 1a. Location of the Cam & Ely Ouse (CamEO) catchment and River Lark sub-catchment. Contains © Crown copyright and database right 2019, and World Ocean Base © Esri, Garmin, GEBCO, NOAA, NGDC, and other contributors.

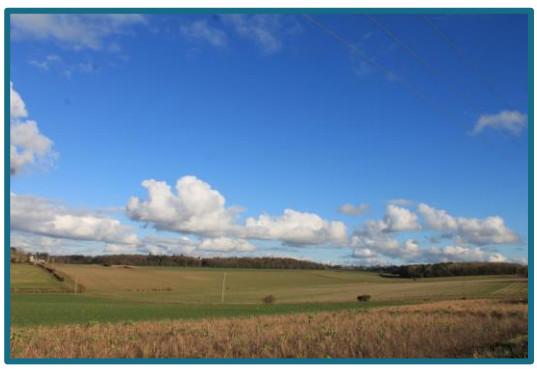

Figure 1b. 'Blackmoor Bottom' tributary valley (top)

Figure 1c. High sediment load in low gradient section of 'Blackmoor Bottom' tributary

Ampton Estate, Bury St. Edmunds, Suffolk

- **Size:** Over 2000 hectares
- **Land use:** Root crops, cereals and grassland
- **Catchment:** River Lark (Culford Stream sub-catchment)
- **Topography:** Some long gentle sloping.
- **Soil type:** Consists of freely draining, slightly acid sandy soils, with some loamy clay soils.
- **Designated zone:** The farm holding sits within a Nitrate Vulnerable Zone (NVZ) and Source Protection Zone (SPZ) for groundwater abstraction.

Culford Stream

Culford stream is one of only 200 chalk streams in the world, 80% of which are found in southern England. These rare watercourses are fed from groundwater that has filtered through chalk bedrock, providing a pure and constant flow of cool water for fish, invertebrates and other aquatic life to thrive.

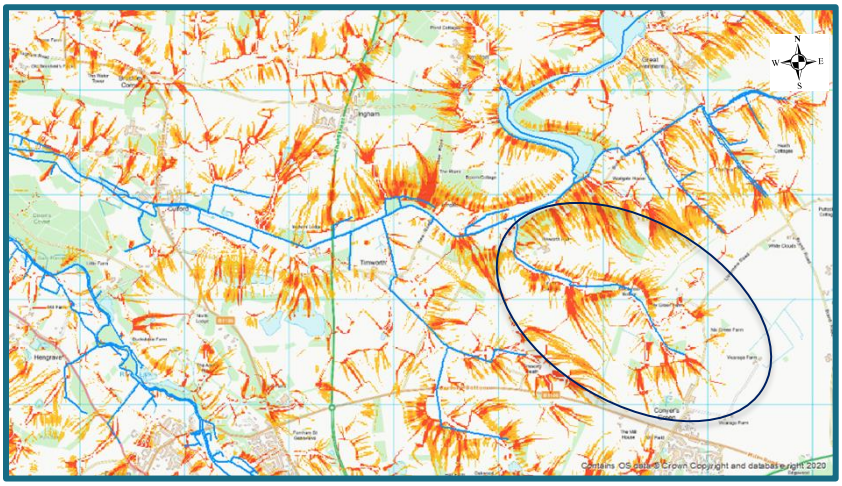

Figure 2. Risk map of Culford stream with Blackmoor Bottom tributary highlighted. The SCIMAP model identifies areas that are at risk of erosion (red and orange = greatest risk). Contains OS Data © Crown copyright and database right 2018.

Figure 3. Mini in-ditch sediment trap

2. The solution

In August 2020, various interventions were installed and constructed at an approximate cost of £5,580. These included:

- **A mini in-ditch sediment trap** – A natural loss of gradient at this point was already leading to suspended-sediment drop out. This was further encouraged with a single log and scalloped pool (Figure 3).
- **A large silt trap** - Blackmoor Bottom tributary was diverted into a large silt trap, upstream of a vulnerable road culvert. Designed to cope with high rainfall events, the trap will capture sediment and allow water to slowly soak into the groundwater. An oak dam and outlet pipe were installed to control water levels, thereby ensuring that the road culvert will not become blocked or overwhelmed (Figure 4).
- **Headlands** – Large 6m grass buffers were sown along Blackmoor Bottom tributary, and the headlands of a high-risk potato field (being sloped and adjacent to a watercourse) were sown with a herbal-grass mix (Figure 5a and 5b).
- **A wetland** – A shallow wetland was created on a straight ditch to capture surface run-off and filter land drain outputs. This will be planted with native wetland species to uptake excess nutrient. Additional tree planting will provide shade and in time, add diversity through fallen wood.
- **Track works** – Various track works were implemented, including the raising and regrading of a track to divert run-off into the top margin of a field, and creating a bund at the bottom of the field to prevent run-off entering the watercourse. Other work involved the installation of a series of grips along a track to direct water out of vehicle wheelings and into an adjacent woodland - this will also prevent the flooding of a highway during extreme rainfall events.
- **Grass leys** – Several fields identified from the walkovers as high risk/connectivity to the Culford stream or groundwater have been taken out of arable production and put into herb rich grass leys as a greening option (Figure 6).

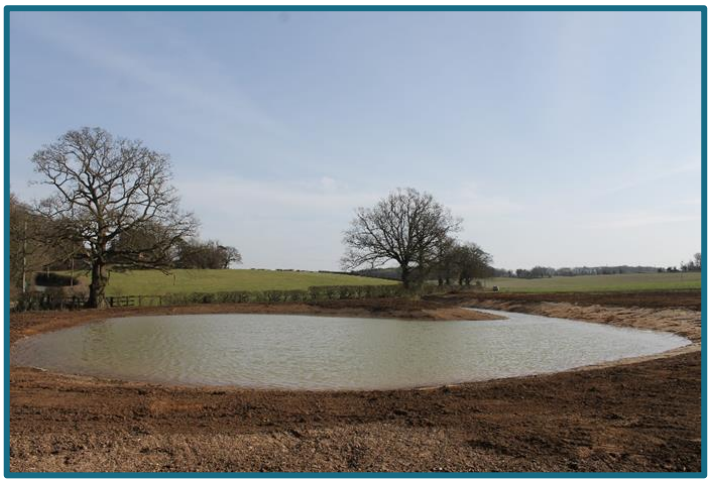

Figure 4. Large silt trap (pre-planting).

Figure 5a. Headland drilled with grass cover instead of wide potato rows

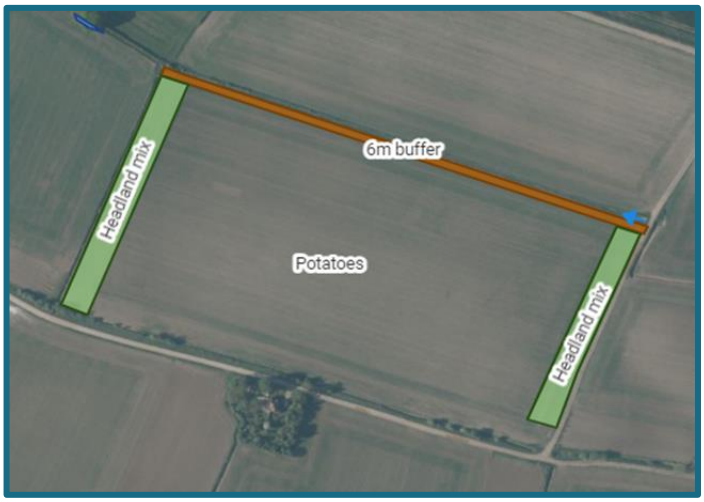

Figure 5b. Field planning

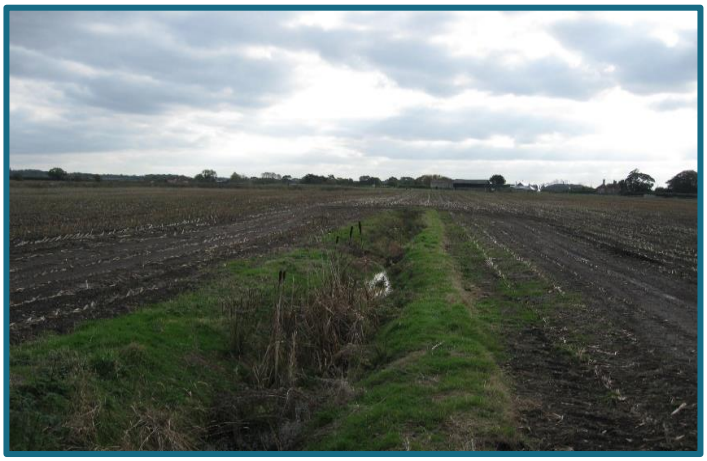

Figure 6. Field with groundwater springs and ditches draining it into the Culford stream taken from maize cropping in 2019 to long term herbal rich lay to protect soil and soak up residual nutrient inputs.

The silt traps and wetlands will be emptied by the farmer when necessary, and the valuable topsoil and any attached nutrients will be returned to the field where it will benefit the farm.

Draining a large area of land, the interventions will also hold back water in wet periods to form a Natural Flood Management (NFM) feature, and this will return (replenish) about 88,200 m^3 of water back to the environment; equivalent to approximately 35 Olympic-sized swimming pools.

Acknowledgements

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