SCIMAP

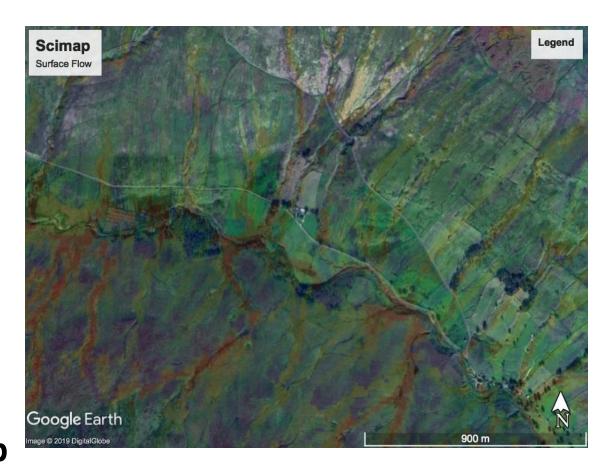## SCIMAP - Diffuse Pollution Risk Mapping

A framework for modelling and mapping diffuse pollution risk across landscapes

Soil Particles
Fertiliser
Bacterial Pathogens
Herbicio

00:58

https://vimeo.com/292277649

Scimap
Surface Flow

Legend

Google Earth

Image © 2019 DigitalGlobe

900 m

https://my.scimap.org.uk/app/index.php

Upper Wharfe NFM Opportunity Modelling

JBA have modelled 10 NFM scenarios (for individual NFM options and combinations of NFM options) for 3 rainfall event magnitudes (10 year, 30 year and 100 year return periods) across the catchment, including:

- Runoff Attenuation Features (RAFs)
- Forest Research Woodland for Water (WfW) opportunity areas
- NT/YDNPA new woodland plantings
- Vegetated buffers alongside watercourses
- Flood bank removal along River Wharfe SSSI
- Soil structural improvement to improved/calcareous grasslands

The largest flood attenuation effect at the downstream outlet to the study area was generated by the maximum woodland scenarios which represented the full implementation of the Forest Research Woodland for Water opportunity areas (for catchment woodland, floodplain woodland and riparian woodland), together with any new woodland plantings undertaken by NT/TDNPA (if they located outside of the WfW opportunity areas), and either with or without the application of an associated soil structural improvement under the tree areas. The flood peak across all the 3 rainfall magnitudes was reduced by nearly 40% and delayed by over 4 hours. This is an extremely generous scenario and highly unlikely to be implemented due to a number of constraints which will preclude such extensive woodland plantings.

The second most beneficial flood attenuation effect was generated by the combination scenario incorporating all the NT/YDNPA new tree plantings, the riparian sub-category of the WfW opportunity areas, vegetated buffers on all watercourses, and all the individual RAFs. This scenario was able to reduce the flood peak across the 3 rainfall magnitudes by 6-9% at the catchment outlet and delay it by up to 25 mins. This was followed by the vegetated buffer scenario implemented across all watercourses which reduced the flood peak at the catchment outlet by 2-5% together with a slight delay.

Some scenarios were able to generate localised flood attenuation benefits, especially at lower event magnitudes, that were not then transferred to the larger catchment scale after other catchment contributions and interactions were included. The flood bank removal scenario within the River Wharfe SSSI reach generated a peak flow increase as the shallow floodwater was able to flow quickly over the smooth grassed floodplain surface and short-circuit meander bends. However, if the reconnected floodplain surface was made rougher to reflect a coarser grass sward which might develop as a consequence of more regular flooding then a local flood peak reduction was predicted by the model.

The results from this study have confirmed that significant numbers and/or areas of NFM interventions would need to be implemented in the Upper Wharfedale catchment in order to deliver discernible flood risk management benefits at the catchment outlet, though localised benefits are present at the smaller sub-catchment scale.

Run-off attenuation features
Woodlands for Water
NT/YDNPA new planting
Vegetated buffer strips
Flood bank removal along the SSSI
Soil improvement